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East Europe Report

ECONOMIC AND INDUSTRIAL AFFAIRS

No. 2268

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PLUTO MINE DISASTER INVESTIGATION UNDERWAY

AU182000 Prague RUDE PRAVO in Czech 17 Mar 82 p 2

[CTK report: "CSSR Goverment Commission on Investigation of the Disaster in the Pluto Mine"]

[Text] Prague, 16 Mar (CTK)--The agencies responsible for explaining the causes and resolving the consequences of the disaster that occurred at the beginning of last September in the Pluto mine, in the North Bohemian brown coal basin, are proceeding with their work.

In view of the extraordinary consequences of this disaster under our condition, outstanding mining experts and specialized research institutes, as well as appropriate institutes of the Czechoslovak Academy of Sciences and certain working places at our university-level educational institutions, have joined the investigations on instructions from the CSSR Government commission. In evaluating the acquired information, they are making use of all accessible theoretical, experimental and practical methods and means. On the basis of all this, the state mining administration and the management are adopting and realizing further organizational, technical and control measures for predicting more accurately the emergence of unexpected phenomena in mining environments, and for eliminating them by active preventive measures, so that even under complicated geological mining conditions the work of our miners would be as safe as possible.

After summing up all the results of the detailed evaluation which is still underway, a final report will be issued on the causes of this extraordinary mining event.

CSO: 2400/213

PRESS VIEWS ECONOMIC CRIME IN COUNTRY

[Editorial Report] AU301805--Prague TRIBUNA in Czech No 11 on 7 March on page 12 carried a 2,600-word article by Jaroslav Kojzar entitled "Losses That Can Be Prevented; To Be Consistent and Uncompromising." In his article, Kojzar gives account of three undated discussions conducted by him and devoted to the "irresponsible approach of some ranking executives to the fulfillment of their tasks" and the "abuse of their official status for illegal and antisocial conduct."

The first discussion--with Antonin Hejtik and Josef Stastny, employees of the CPCZ Central Committee's general department--deals with letters addressed to the CPCZ Central Committee containing complaints and "notifications" about some people's illicit use of their authority. Hejtik views it as positive that such letters are addressed to party bodies, and interprets this as an "expression of trust."

Giving an example, Kojzar cites the letter by a citizen from Sokolov drawing attention to malpractice in the city's district investigation by the regional CPCZ control and auditing commission and resulted, according to Kojzar, in "a number of high party punishments, recalls from posts, and custody by order of the prosecutor's office." The culprits included the "director, his two deputies, the head of the transport department and an employee of the Czech Planning Commission." Speaking about the charges, Kojzar mentions, among other things, that the director delivered 36.5 tons of enterprise-owned coal as payment for the repair of his official car that had been demolished by his son during unauthorized use of the car; or that an official car had been repaired by the enterprise at a cost of Kcs6,000 only to be sold immediately thereafter to the deputy director for Kcs633.

Other examples cited in the article concern the director of the Jindrichuv Hradec forestry enterprise who used "incorrect methods" to obtain a lot for the construction of family homes for himself and his son; the case of the director of the Zelenina [vegetable] production enterprise in Terezin who had an enterprise-owned kiosk erected in his private garden without paying for it; and the illicit use of official cars for private trips by directors of various enterprises in Sokolov, Prague, Ceska Lipa and Olomouc.

According to Hejtik, the Central Committee receives "a number of such letters," many of them drawing attention to "so-called trifles." But it is precisely such "trifles" that touch off a "negative political response," warns Hejtik.

The second part of the article--the account of Kojzar's discussion with Maj Frantisek Tinka, deputy chief of the Economic Crime Department at the Czech Socialist Republic's Criminal Service Administration--deals with bribery. Tinka reports in it on the case of a deputy director of the automated management enterprise who, by juggling accounts, used enterprise material as bribes during negotiations with business partners from the Ostrava-Karvina mining concern, the Ostrava mining construction enterprise and other enterprises. Tinka attributes such cases to "some present economic difficulties," especially in supplier-consignee relations.

The third discussion--with Col Josef Janurek, chief of the Federal Criminal Office, and his first deputy Col Vaclav Cerny--mentions two more recent cases of economic crime that became the subject of court proceedings. The first involved the managers of Kosice and Zvolen construction enterprises who, by juggling accounts, used Kcs240,000 worth of their enterprises' construction material to build their weekend houses; the second involved the former director of a united cooperative farm in east Slovakia who embezzled Kcs108,000 and--by paying himself and other ranking employees bonuses to which they were not entitled--impoverished his farm by an additional Kcs155,000. In the discussion, both Janurek and Cerny emphasize the political implications of crimes committed by high-ranking employees and the resulting need to fight them "consistently and uncompromisingly." "Offenses committed by ranking executives contain something which other offenses lack, they are capable of influencing tens of hundreds of surrounding citizens who wait on how, and how quickly, they will be resolved. This shapes their attitude not only toward the public security corps but toward the system in general," says Janurek.

Prague MLADA FRONTA in Czech on 27 March, on page 1 of the weekend supplement, carried a 3,500-word undated Eva Hirschova interview with Karel Pesta, senior prosecutor at the CSSR General Prosecutor's Office, entitled "Economy in Between the Paragraphs."

Responding in his initial statement to a question in four defendants or 60,000-70,000 people annually are charged with acts "against the socialist economy," most of them employees of the affected organizations. More than 80 percent of the defendants have no previous criminal record, according to Pesta.

In her next question, Hirschova confronts Pesta with the problem of economic crime that is committed "in higher interest"--for instance bribes that are given to obtain scarce materials to safeguard normal production. In his answer, Pesta first asserts that it is rarely the case that the offender does not himself profit from such acts. To illustrate his point, he cites the case of the former director of the Jitona enterprise in Ostrov Nad Ohri who was recently sentenced to 8 years for having given furniture produced in his enterprise as presents, or having sold it at "inordinate discounts." Even though he claimed in court that "he did not profit from it in the least but only wanted to obtain advantages for his enterprise," it has been ascertained, according to Pesta, that he was linking his sales with the delivery of cheap construction material for his weekend house, and so forth.

Pesta goes on to say: "In court, these offenders argue: What should I have done, I cannot close down the factory, can I? We have a stereotypical answer to this: Dear defendant, you should have asked this before and elsewhere. We are lawyers and criminologists, we cannot give you this answer."

To show that it is possible to safeguard production tasks without violating the law, Pesta then cites the case of an unspecified large factory that is now subject of prosecution which had for 3 years been producing "nothing but rejects," causing damage estimated at Kcs60 to 70 million. The director now reportedly argues that otherwise he would have had to close down the factory. As Pesta says when a new management took charge, the enterprise stopped producing rejects without having to deprive the employees of their jobs.

Pondering the causes of economic crime, Pesta then says: "In a number of plants and enterprises, it is an open secret that the plan is being fulfilled only on paper, that the employees are taking so-called 'tokens of gratitude' [vsimme], that there is a black fund, that the production is unprofitable or of poor quality. But everyone is silent.... The indifference of the surrounding, the poor functioning of control, the lack of interest in these issues on the part of social organizations, the social climate--that is one of the causes of economic crime."

Hirschova then turns the discussion to bribery, and confronts Pesta with the view of a MLADA FRONTA reader that "bribery and other abuses in economic life cannot be fought by any prohibitions and orders but only by sufficiency." Pesta admits that "disproportions in satisfying needs" play a role in this respect, but adds that "it is not our job to solve problems instead of economists; our job is to guard the law." He also notes that economic crime such as speculation does not concern any essential articles but "pornographic literature, jeans or records."

In the concluding passages of the interview, Pesta discusses "petit bourgeois vestiges" and "snobbishness" as one of the frequent motives of economic crime (referring in this context to the recent case of the director of an unspecified enterprise who had to answer to the court for having used enterprise money to finance a soccer team); the difficulties faced by the prosecution in tracking down intricate cases of sophisticated "white collar" cime; and the need to punish all offenses. He says in this context: "Every unpunished offense generates, in fact, a new one. It is alarming from this viewpoint that in 1976 there was a sharp decline in the statistics of petty crime. Is it possible that all of a sudden people became disciplined and stopped pilfering property in socialist ownership? In the development of criminality such leaps are not possible. This may be true of potatoes, that one year there is a good harvest and the next a poor one. It cannot be ruled out that in those years a generation of people has grown up who have grown accustomed to it that when they steal a little, nothing is done about it. And that is very dangerous."

Bratislava VECERNIK in Slovak on 26 March on pages 1, 8 and 9 carries a 6,000-word speech by Gejza Slapka, member of the CPSL Central Committee Presidium and leading secretary of the Bratislava CPSL city committee, at a 22 March Bratislava aktiv devoted to "socialist legality and strengthening legal awareness." A large section of his speech is devoted to economic crime. According to Slapka, "economic crime is an extraordinarily grave all-social phenomenon that has a negative impact on the development of the socialist society. At the same time, it is an outward sign of the discrepancy between the social awareness and the social being of a part of the population. In assessing the social danger arising from this type of criminal activity, we must not resort to merely expressing the damage in financial terms because the moral damage caused by economic crime, too, has social consequences."

Slapka notes that economic crime accounts for 23 percent of all criminal acts, and "direct pilferage," in turn, for 60 percent of all economic crime.

In his analysis of the causes of economic crime, Slapka pays special attention to "insufficient record-keeping and control" and to "serious shortcomings in cadre word." Givingan example of inconsistent control, Slapka refers to the ongoing investigation of "extensive criminal activity in connection with the procurement of waste paper from individual socialist organizations. The damage computed so far caused by pilferage represents Kcs600,000. The rub is that the individual organizations that were harmed never controlled, not even at random, how much paper they were actually delivering, even though this often represented considerable financial sums." According to Slapka, employees of the supplying organizations cooperated with employees of the procurement organization in this criminal activity, by manipulating figures.

Speaking about shortcomings in cadre work as a source of economic offenses, Slapka says: "How are we to assess the fact that a citizen who had received an unsuspended sentence was accepted, following his release, as the manager of a food store. When he caused a deficit there also, he was recalled from the post only to be presently appointed manager of a different trade facility of the same enterprise." In this context Slapka also criticizes that people are often employed as factory guards who lack the requisite "moral profile." This, together with the "advanced age" and "insufficient psychological and physical prerequisites" of many other factory guards, facilitates breaking into premises of socialist organizations.

Having noted that in 1981 the damage caused by economic offenses, presumably in Bratislava, amounted to more than Kcs8 million, Slapka urges managers to "critically examine their attitude toward protecting property in socialist ownership and to draw rigid conclusions against those employees who fail to establish the necessary safeguards against the possibility of economic criminal activity."

In the subsequent part of his speech, discussing the problem of corruption and bribery, Slapka notes that the measures adopted since the 1980 resolution of the CPCZ Central Committee Presidium on this matter "have not been sufficiently reflected in changes in the attitude and conduct of many individuals, and even economic organizations." He hotes that in 1981 only 31 cases of bribery and corruption were registered by the courts, but adds: "The findings of many primary party organizations, but also discussions with citizens, suggest that there are far more cases of corruption and bribery in our society. We also often hear this about the economic sphere. In giving reasons for difficulties in production, many managers indicate that materials that are in short supply can only be obtained when offering illegal reciprocal services, be it to the supplying enterprise or its individual employees."

Citing an example of corruption that has become the subject of investigation, Slapka refers to the case of a Bratislava real estate assessor who is charged with having damaged the state in assessing the value of properties bought by the state.

Concluding his elucidations on bribery, Slapka says: "The struggle against corruption and bribery cannot be merely a concern of the agencies involved in legal proceedings. We must wage an uncompromising struggle against this abuse that depreciates the political, ideological and often even material values created by socialism. Everyone must start this struggle in his own environment, at every workplace. The higher and more responsible post someone holds, the more urgent is this task. Otherwise it will be virtually impossible, even with the best declarations and measures, to achieve a substantial improvement with respect to this antisocial activity."

Further on, Slapka discusses crime in general. He notes, among other things, that despite "a number of positive results" in the struggle against juvenile delinquency, young people up to the age of 29 account for more than 75 percent of all criminal acts committed in Bratislava. He also notes a disproportionate share of the gypsy population, saying that out of the 92 offenses committed in Bratislava last year by children up to the age of 15, 29 offenders were of gypsy origin. In his speech, Slapka also emphasizes the negative role of alcohol (saying that it accounts for 38 percent of all criminal acts), and deplores the "liberal" attitude toward this problem.

CSO: 2400/213

FOREIGN TRADE IN 'SET OF MEASURES' DISCUSSED IN SEMINAR

Prague RUDE PRAVO in Czech 11 Mar 82 p 3

[Roundtable discussion organized by RUDE PRAVO on the "Effect of the 'Set of Measures' in the Area of Foreign Trade"]

> [Text] To develop export competitiveness of the national economy is one of the most important contemporary tasks of our national economy. To increase the export efficiency of the national economy is, therefore, one of the principal goals of the "Set of Measures for Improving the Planned Management System of the National Economy."
>
> RUDE PRAVO organized a roundtable discussion on how the "Set of Measures," which has been in effect for more than a year, has affected export efficiency and what should be done in the future with Eng Ladislav Matejka, secretary of the Government Committee for Problems of Planned Management of the National Economy, and Josef Pasek, worker of the CPCZ Central Committee. The other participants were: Dr Engr Frantisek Fremund, general manager of PZO [Foreign Trade Enterprise] Pragoexport; Oldrich Havlicek, manager of the First Brno Engineering Plant; Eng Jaroslav Hnizdil, manager of Factories Manufacturing Machinery for Flour Mills; Docent Eng Ladislav Kubik, CSc, VSE [Advanced School of Economics]; Eng Miloslav Mikes, CSc, general manager of PZO Skodaexport; Prof Eng Jaroslav Nykryn, DrSc, VSE; Eng Vojtech Rousal, chairman of the economic commission of CV [all-factory committee] CPCZ PZO Kovo.

[Question] What is your opinion on the effect so far of the "Set of Measures" on increasing the export efficiency of our economy?

[Answers]

O. Havlicek: Our enterprise works on the premise that it is necessary to increase production efficiency to the maximum possible extent particularly with reference to technically progressive products which we should export. Some principles of the "Set of Measures" must be worked out in more detail, because in the area of assembly modules, for example, they are not effective. Let me give you an example : while in some instances we need only 5 percent of imported complementary components to export a power plant, sometimes we need as much as 40 percent. We deem it appropriate to strengthen the function of the general contractor as early as in the plan and to set up a strong OZO [foreign trade organization] for export of complete industrial plants.

J. Nykryn: The "Set of Measures" does not sufficiently deal with four groups of problems in our external economic relations. In the first place, the importance of external economic relations is substantially greater than various indicators show—for example, the share of foreign trade in the national income. It permeats the entire economy. There is hardly a factory whose production does not depend on exports or imports. Secondly, the CSSR participation in the international division of labor is still rather small. The world's engineering industries make approximately 6,000 basic types, approximately 50 percent of which are manufactured in the United States, 20 percent in the FRG, 17 percent in Japan. We produce more types than is feasible. There is only one solution: bigger production and product specialization, and related cooperation. The third problem is our excessive consumption in manufacturing, which increases our deficit in the balance of payments. Fourthly, the "Set of Measures," in my opinion, does not sufficiently promote the adaptability of Czechoslovak production to world conditions. This is due to stereotyped thinking and is reflected in obsolete technical standards, complex regulations and so on.

L. Kubik: The "Set of Measures" paved the way to the solution of problems in management of the economy. An effective and combined application of its principles in foreign trade and production should lead to the adoption by both partners of uniform goals and principles in the first place. By that, I mean the intensification of the national economy with the active participation of science and technology, and of external economic relations as one of the basic factors in economic growth. Secondly, it should lead to uniform proportions, rational production and export structures corresponding to the potential of our economy and to sales conditions on world markets. In the third place, it should lead to the application of uniform criteria (for example, the criteria of relations between foreign and objectified domestic prices, currency criteria so that the Koruna would serve as the standard of values, criterion of prices and preserver of values). The system of management must be interpreted in comprehensive terms, in the light of the mutual interdependence of individual components, differentially oriented to the discharging of their management functions.

V. Rousal: While we were essentially an export enterprise during the last few five-year plans, it is imports which slightly predominate now—approximately in the ratio 7:6. In other words, we did not succeed in implementing the resolution of the 16th CPCZ Congress. This is all the more serious since we act in the foreign trade area as the representatives of eight large concerns and other enterprises. I see in this a failure of certain provisions of the "Set of Measures."

M. Mikes: The present system of foreign exchange incentives does not sufficiently stimulate either the general contractor or the subcontractor. These incentives should be expanded and restricting provisions abolished. In my opinion, it would be a good idea, if VHJ [economic production units] could also use foreign-exchange incentives for financing their social programs, for example. The incentives would then be much more effective.

F. Fremund: The essential effect of the "Set of Measures" on export competitiveness should be reflected, in my opinion, in noticeable innovation and more extensive assortment offered to us by our suppliers. A year is too short a period for a radical change in the thinking of management personnel, economists, technicians and in the long-standing system of production. Our assortment can be described as a set of products with good use properties (complaints concerning workmanship and quality do not exceed 10 percent over a long period), but with a few substantial innovations. This situation must be remedied despite the fact that innovation of our assortment requires ingenuity, is laborious and often involves risks. However, the incentives for production changes are not effective enough. The incentives should be so strong as to compel workers to make full use of their skill and initiative.

J. Nykryn: The "Set of Measures," however, makes it essentially possible to reconcile by additional measures one important fundamental discrepancy. While—with the exception of raw materials—there exists a buyers market in the world, we face the opposite situation in our country—we still have a seller's market. In other words, we must strengthen the customer's position, particularly in the area of exports.

L. Matejka: One of the principal goals of measures enacted for improving the management system last year was to increase the export efficiency of our economy. The effect of the measures in this respect is now being analyzed in detail both in the production sector and foreign trade. Although it is clear that we cannot identify with the "Set of Measures" all positive or negative phenomena in our economy last year, some conclusions can already be drawn and on their basis future steps planned for making individual tools of management more effective.

I am of the opinion that the results achieved in exports were positively affected by the increased pressure of the entire management system on the technical standards and quality of products and on the reduction of material consumption. The rules governing the use of economic tools in exports made it possible to create considerable funds for financial incentives in all VHJ which achieved higher efficiency and higher increases in export volume. It is, of course, necessary to see that financial incentives alone for increasing exports cannot solve material problems in the structure of supply and demand for export goods, disproportions and inflexibility in supplier-customer relations, our lagging behind in technical standards, inadequate marketing techniques and so on. To put it briefly: the material advantages promised by the more aggressive and purposeful export policy of VHJ obviously cannot yet fully compensate for the difficulties and risks involved in its implementation.

In other words, either the economic pressure of rules and existing forms of economic ties between production and foreign markets are not yet tight enough, or the material and systems conditions in which VHJ operate are not sufficiently favorable for an active and initiative approach to the formulation of their export strategy. In both these respects, therefore, it will be necessary to explore by experiments or application of stricter rules ways of underscoring the key role of exports in our economy and linking more tightly VHJ economic interest and khozraschet as a whole to the results achieved in foreign markets. Financial incentives in foreign-trade enterprises must, of course, be set up in accordance with this approach.

J. Pasek: The 16th CPCZ Congress and the Fifth Plenum of the CPCZ Central Committee emphasized the key importance of external economic relations for the successful fulfillment of the Seventh Five-Year Plan. If the plan targets set for external economic relations are to be met, production must closely and effectively cooperate with foreign trade and have a common goal in mind—the implementation of party economic policy. This close and effective cooperation of production with foreign trade must be supported by the entire economic mechanism. The "Set of Measures for Improving the Planned Management System of the National Economy" created the basis for this increased cooperation of production with foreign trade. It is necessary to make use of all possibilities offered by the "Set of Measures" to develop it further by proposing new and more effective measures which will further tighten economic links between production and foreign trade.

[Question] Who in your opinion should be responsible for export results?

[Answers]

M. Mikes: Although the answer is likely to be expected that it should be one person in the entire republic, this would not be correct. Responsibility must be shared by all organizations and institutions involved. As a foreign-trade organization, we must first find business, create commercial and political conditions for it in the territory in question, establish appropriate connections, secure financing—in other words, cover the entire area of marketing and merchandising. We expect the production sector to supply what the market demands and not ask us to sell what it manufactures. The production sphere must bear responsibility for technical and economic parameters and for both prompt delivery on time and service. Moreover, the bank should be an organ which not only controls, but also helps, if the market situation is difficult. The central sphere should create an appropriate export climate by the planning method. In other words, the role and responsibility of each participant should be precisely defined.

J. Nykryn : I want to add a few words to what has just been said and to define responsibilities more precisely. It is correct to speak of the common interests and tasks of production and foreign trade. Yet, responsibility must be divided. The foreign-trade organization is responsible for export results, while the production unit is responsible for manufacture of goods to be exported. By the little word "common" we sometimes conceal the symmetry of responsibility as well as of jurisdiction between the two units. The workers at foreign-trade organizations should pay more attention than in the past to merchandising, in which reserves still exist. As of now, however, they spend as much as 60 percent of their time on acquiring export goods for which, of course, production should be responsible. In other words, there must be greater specialization if effective results are to be achieved.

V. Rousal: It seems to us that the responsibility for exports, particularly by production enterprises, was not reflected either in the incentive rates or evaluation of activity in question. In particular, the enterprise's role is underrated. The export targets are settled at the ministry and VHJ, and the enterprise receives only a detailed list of assignments which often shows many defects. This should never happen. The enterprise bears main responsibility for the nonfulfillment of the plan. And I have not yet referred to plants which manufacture primarily for export, but whose managers are never consulted. What I want to emphasize is this: the responsibility for exports must be shared by many more people, including those who control quality, see to it that deliveries are made on schedule and so on. Perhaps it would be worthwhile to specify financial incentives all the way down to the enterprise or even plant level.

J. Hnizdil: I regard the division of responsibility as given. Foreign trade is responsible for merchandising, production for manufacture and technical standards. But everything is interdependent. A complete industrial plant grows through mutual cooperation which depends upon people, their initiative and professional skill. As a result, cooperation may be good or inadequate and, therefore, the subject of constant criticism. But we must solve some fundamental questions, for example, the plan must be identical from the top—SPK [State Planning Commission]—all the way down to production enterprises and foreign-trade enterprises. But this is not so in practice. There is something in the detailed plans for foreign-trade organizations, and something else for VHJ. This problem must be solved because there is no use in inventing new principles. There are also other questions such as the problem of risk in exporting complete industrial plants, of designing projects on time, of incentive rates for higher prices. We are going to export 86 percent of our products this year, but as much as 90 percent in 1985. So far as I am concerned, all enterprise incentives depend upon exports. But the incentives should also be increased, in my opinion, for enterprises which export only 30 percent of their production. But the incentives should be differentiated.

O. Havlicek: During our long association with Skodaexport, there has not been a single instance of not reaching agreement or of reproaching one another. As to the financial incentives within the enterprise, they are specified in the enterprise premium systems and distributed among the workers concerned--in the production departments all the way down to the sales department. In the production enterprise, we bear full responsibility for technical standards and quality of products. This is what we mean by responsibility.

L. Kubik: The February session of the scientific council of the VSE dealt with the problems which we are discussing here today. Comrade B. Urban, minister of foreign trade, at that session emphasized the "necessity of finding forms of financial incentives which people will really understand and which will make them realize the links to export results. Both positive and negative impacts must be just and hit the right spot." Prices, for example, must be in effect uniformly along the entire vertical line so that their effect is felt in all production phases as well as in foreign trade which is responsible for the sale of Czechoslovak products on foreign markets. By the correct application of positive and negative incentives, a climate must be created for innovations and effective exports, that is, a symmetric system of incentives and penalties which will take into account the demanding nature of world markets. Enterprises which earn millions of Korunas for the national economy or squander funds in the area of production factors must feel the im pact in their bonus funds.

L. Matejka: Defining as accurately as possible the responsibilities of VHJ and foreign=trade enterprises is extraordinarily important, particularly if production and foreign trade are organizationally separated. This is a complex question and often also controversial in practice. I would like to emphasize two aspects of the problem. In the first place, the dividing line of responsibility among individual organizations cannot be drawn in such a way as to imply separate production activity from foreign trade activity. Production must be responsible not only for manufacture of products of a high technical standard and quality, but also for their effective sale on foreign markets. On the other hand, PZO should be held responsible not only for the most advantageous sale, but also for the most effective use of our production capacities and the highest possible remuneration for our national labor. This is the division of labor in accomplishing the common task--the attainment of the highest possible efficiency of the reproduction process in the given area.

This division of labor should be on a strictly economic nature. The specific form of mutual responsibility of both partners (including the stipulation of who is, and how he is, responsible for the risks related to foreign trade activity) should be stated in the contract signed by them. It is obvious, of course, that their economic interests must essentially coincide and must conform to societywide interests. We know that this is not always so in practice as of now.

J. Pasek: Although the question of responsibility for export results must be judged in a broader national economic context, for the sake of simplification we can say this: the production sector must be responsible for production of such use values as will correspond to the parameters of foreign markets. The foreign trade sector must achieve the highest possible prices for competitive products sold to foreign customers. At the same time, the quality work of production and foreign trade sectors in this respect creates the basis for the effective cooperation of two equal, but demanding partners within the same economy.

[Question] Is it possible to increase the foreign trade volume by international cooperation and production specialization?

[Answers]

M. Mikes: On the basis of our past experiences, I can say that cooperation is possible in the export of complete industrial plants. We have carried out some of our exports in cooperation with Soviet partners, others in cooperation with Western firms. Within CEMA, however, we encounter one stumbling block: all of us manufacture identical basic equipment, but nobody manufactures complementary components. What we lack is specialization in production, division of tasks among individual foreign-trade organizations.

J. Nykryn: It appears that the coordination of plans within CEMA is no longer enough today, but that we must also coordinate our economic policies, especially those dealing with external relations. It would be desirable, for example, to achieve coordination in pricing and price policies so that cooperation agreements be advantageous for both partners.

L. Matejka: On the initiative of the 26th CPSU Congress and the 35th CEMA Plenum, increased attention is being paid to the potential expansion of cooperation between the socialist countris on the basis of direct realtions between production organizations, and to the establishment of joint enterprises and international organizations. It is imperative now to create both organizational and economic conditions for highly effective direct cooperation in research, development, production and sales which will advantageous to all participants. We see in this a great opportunity for expanding our participation in the international division of labor and for making it more effective.

F. Fremund: Pragoexport is the typical representative of an organization engaged in the export of small consumer goods. It may seem that cooperation is impossible in this area. Nevertheless, we have signed many cooperation and specialization contracts with the organizations in the USSR, the GDR and in the nonsocialist states, and we have proposed additional cooperation agreements to our Soviet and Hungarian partners. Their purpose is both to satisfy the needs of our domestic market and to increase exports. Nevertheless, I must admit that greater activity in this respect would be desirable.

V. Rousal: KOVO has signed 29 specialization and cooperation contracts, 3 of which are with foreign firms. The best results have been achieved in those instances where both partners manufacture the same final product and the problem of production capacities is solved through subdeliveries. Cooperation with Western firms is also positive, but does not make full use of the potential of enterprises supervised by the ministries of electrotechnical industry and general engineering. Cooperation, however, must not be interpreted only in terms of imports of necessary components or products without producing by exports the funds for financing these imports. Economic problems must always be dealt with comprehensively.

J. Pasek: I do not think that it is necessary to especially emphasize the importance of production specialization and cooperation. Sales of products manufactured through production specialization and cooperation are among the most dynamically developing areas of world trade. As to the present scope of production specialization and cooperation with the socialist countries, we may say that there has been an increase not only in the number of signed contracts but also in terms of contribution of specialized production to the economy of the socialist countries. In 1980, for example, the share of specialized export of machinery in Czechoslovak exports to the CEMA countries was approximately 28 percent. There still are, however, some important equipment and technologies which the socialist countries import from the capitalist states. A major milestone in this respect was the 102d Plenum of the CEMA Executive Committee which discussed the problems of cooperation in the engineering sectors that are of key importance to the economic development of fraternal countries, such as the development and manufacture of industrial robots, precision machine tools, machines for comprehensive mechanization of agriculture and so on.

As to production specialization and cooperation with the nonsocialist states, we cannot be satisfied with the present situation. The share of cooperative exports in total exports to the nonsocialist countries is less than 1 percent. Thus, it is imperative that, in consideration of all political aspects, the production and foreign-trade sectors explore the ways of increasing this percentage.

O. Havlicek: I think that we make little use of production specialization and cooperation. Usually we remember this cooperation only if we are not able to manufacture complementary components. For this reason, cooperation—particularly in the area of complete industrial plants—should start as soon as a project is planned. We should also revalue the results of negotiations on cooperation and specilization in various commission because the results do not seem commensurate to the effort exerted.

L. Kubik: The increase in economic effects of international socialist production specialization and cooperation will depend on: the comprehensive coverage of the production process, research, design and engineering, standardization and uniformity; degree of cooperation in the area of subassemblies, components and elements; flexibility in scientific-technical preparation, planning and technical-economic justification and evaluation of projects; a more thorough elaboration of financial and foreign-exchange mechanisms as well as of principles governing the long-term pricing of products; activity of consumers themselves. In view of the importance of the Czechoslovak engineering industry, the present situation merely indicates the future trend in these relations. In expanding cooperative relations, the production sector should look for one of the potential solutions of production and technical problems.

[Question] How can cooperation between VHJ and foreign-trade organizations be improved?

[Answers]

M. Mikes: Although our cooperation with the production sector has some positive features, it does not correspond to the needs and situation on the market. We have a specific idea on how to cope with it and have submitted pertinent proposals to our ministry. We deem it necessary to cooperate more closely in the decisionmaking process even before the final contracts are signed—not only with the production sector, but also with other partners and the bank, ministries of finance and foreign trade and sometimes also with the SPK. We, therefore, propose in connection with the export of complete industrial plants to set up a special operations council, where the representatives responsible for individual sectors will make decisions on which projects effort should be concentrated, and which individual projects should be carried out and how. The period after the signing of contracts already follows its own rules, but the decisionmaking process prior to signing of contracts requires closer cooperation.

J. Nykryn: I agree with what has been said so far, but I would like to make three comments in this connection. In the first place, the operations council must be granted supreme authority; its jurisdiction must be backed up by legal and economic pressures and it must have the right to impose sanctions. Secondly, there must be a joint and uniform detailing of the plan to the SPK through the ministries to the production and commercial enterprises. Thirdly, different methods are employed in the evaluation of the plan fulfillment. Production is judged according to the time, when the product is turned over to the shipper or placed in a warehouse; but foreign trade organizations are judged mostly according to the time the goods cross the state border. At the beginning, the conditions should be made uniform on the f.o.b. state border basis. Sometimes in the future, however, the obligation should be regarded as having been met at the moment, when the foreign-exchange claim arises. This, of course, will require a revision of provisions in effect at the present time.

L. Kubik: Apart from what has already been said, there are additional ways of improving cooperation between the production sector and foreign trade. For example, the strengthening of both sectors by young properly qualified workers. However, can the production of foreign-trade organizations hire 10-20 graduates of foreign-trade or industrial economics for 1-2 years' practical training? Yet, everybody recognizes that this would be very good for gaining experience.

O. Havlicek: I think that nobody without previous practice in the production plant should join a foreign-trade organization. One year seems to me too short a period, I would be in favor of at least 3 years' practice. We probably could not hire 20 workers at once, but two workers a year would be possible.

F. Fremund: The signing of agreements on mutual cooperation has proved successful. We have signed a number of such agreements with major economic production units for the duration of the Seventh Five-Year Plan. We check on their implementation twice a year. Another form of cooperation is the advisory board which was set up as early as 1976. It convenes twice a year, we jointly explore urgent problems with the production representatives. Combined task forces study specific questions of innovation, shortening of delivery periods, better packaging techniques, scheduling of more evenly spread export shipments and so on. We stimulate the production sector's interest in the best possible export shipments by organizing competitions for the best new products, the best product in the sector, exemplary fulfillment of export tasks. Nevertheless, we think that cooperation with the production sector can be further improved.

J. Hnizdil: Although it is theoretically clear, it does not develop practically as we would wish. Various advisory organs can be useful depending upon the matters they discuss. If they will amuse themselves by discussing the general aspects of mutual relations, they will not be very effective because the khzoraschet sphere needs concrete conclusions. Some problems must be viewed from our positions. For example, we cannot disrupt a cycle processed by the computer, but we can upon mutual agreement revise the system of advance orders. It is also necessary to treat cooperation from the international standpoint. We have, for example, a specialization contract with a foreign partner which stipulates what we and he should do, but we have not yet delivered a jointly manufactured unit to the third market. Why? Because the price aspects of cooperation have not been agreed upon.

F. Fremund: We organize a closed Pragoexpo exhibition for our foreign customers every year. The exposition is not open to the public, but is also attended by our delegates and representatives of production. This year we made available to our delegates a large amount of foreign-exchange korunas and asked them to purchase samples of comparable foreign-made goods which are manufactured in our country and offered for sale. We shall exhibit them at Pragoexpo and list the prices at which our competition sells them, how soon it can deliver them and what service it provides. This will be instructive not only for the representatives of our production sector, but also for numerous delegation which visit our exhibition.

[Question] How are we to further improve foreign trade activity?

[Answers]

L. Matejka: Experiences with the implementation of the "Set of Measures" so far make it clear that one of the important conditions for effective and properly oriented cooperation is the consistent coordination of plan indicators with the interlinked financial incentives in VHJ and OZO. The shortcomings in this respect sometimes give rise to conflicting interests detrimental to cooperation.

Secondly, I think that foreign-trade organizations should take a very active part in working out the concept of production increases in individual sectors from the standpoint of a long-term export strategy. At the same time, they should sign long-term agreements with production based on the five-year plan, agreements which would specify basic directions in the development of the deliveries' structure, orientation and deadlines for innovations, service tasks, certain questions related to price development and so on.

An indispensable part of good cooperation is comprehensive information of the production sector on the situation in foreign markets and, on the other hand, foreign-trade organizations' perfect knowledge of possibilities and problems of the production sector. This, of course, requires that contacts between production and foreign-trade organizations be based on really comradely relations characterized by frankness, sincerity and mutual criticism.

M. Mikes: I would like to express three wishes. First, that the plan of exports, including exports of complete industrial plants, should be governed by a long-term and not an annual plan. Secondly, the VHJ and OZO plans should be identical and exports of complete industrial plants should be put in the same category as the construction projects directly supervised by the government. Thirdly, our planning methodology should introduce the terms of direct and indirect exporters, and VHJ should be evaluated according to the total of direct and indirect exports because one without the other does not make sense.

J. Nykryn : It would be worthwhile to consider an experiment in continuous planning--not only in the area of exports, but also in supplier-customer relations, contracts on cooperation and so on. The plan would then become a real tool of management, constant changes and correction would not take place. It is often said that the foreign-trade organizations are commercially strong units. Their strength, however, cannot always be fully utilized because of the rigid regulations and other legal provisions whose observance makes it impossible to make full use of what is called the power of monopoly. This involves, for example, parallel business transactions, when the Western world has long since adopted the system of so-called counterpurchases. The same is true of the use of import commercial credits on the purchase of new equipment for more efficient processing of domestic raw materials. Thirdly, leasing of equipment for direct use in productive manufacture. If such an arrangement is advantageous for capitalist enterpreneurs, it could also be advantageous for us.

L. Kubik: We cannot change the advancing polarity between the technically prominent and lagging manufacturers or price differentiations on the world markets. However, we can change internal production conditions and improve marketing in the foreign-trade area. Many are of the opinion that without a revision of the management system of the economy the functioning of its subsystem, that is foreign trade, cannot be significantly changed. The general thesis of the indispensability of the export-oriented management system of the economy does not mean that foreign-trade management must passively wait for a period when something happens in the entire national economy. Active impulses from foreign trade as the key area directly connected with the world can speed up the improvement of management of the entire expanded reproduction process.

O. Havlicek: We have conducted many analyses of products in order to determine which of them would be most suitable for export. But the people in supervisory organizations have never told us: yes, this is so. In the long run, however, the situation should be actually reversed—the ministries should tell us what would be most advantageous to manufacture. We could make better preparations for it.

J. Pasek: The discussion made it clear that for further improving of cooperation between the production sector and foreign trade, the economic interlinking of these two partners is of the utmost importance. This means that the plan, pricing, financial and economic tools must effectively promote such as linkage of production with foreign trade as will be reflected in the higher export competitiveness of our national economy and the efficiency of the entire reproduction process. The "Set of Measures" created the basis and must be systematically translated into reality. In particular, it is necessary that the enabling legislation related to the "Set of Measures" comprehensively cover all national economic links and create a demanding economic climate for the work of both the production sector and foreign trade. It must be seen that the "Set of Measures" is not a closed document, that its effect is constantly analyzed and improved. We must, however, make a distinction between what is objective, what is the effect of the economic mechanism, what is caused by people, by their attitude toward the fulfillment of tasks and duties. No "Set of Measures" will be of any value if poor management, lack of thoroughness and responsibility, inadequate control persists in the production sector or foreign trade.

Increased cooperation of production and foreign trade must also be promoted by measures such as the establishment of operations councils in the foreign-trade organizations, a move which should help in the joint solution of key problems related to export tasks and in the formulation of long-term production and sales programs. It will also be necessary to adapt, as much as possible, the organizational structure of foreign trade enterprises to the production technical basis, and to do more in the purposeful centralization of production units supplying foreign trade with export goods.

> What conclusions can be drawn from this discussion on the effect of the "Set of Measures" in the area of foreign trade? Much has already been said in the course of the discussion itself. Everything indicates that the changes which took place in the world economy during recent years are of a long-term and permanent nature. Life proves that the world will not adapt to us, but that we must rapidly and effectively cope with its requirements. This situation makes efficient work in the production sphere and foreign trade absolutely imperative. Only exports of high-quality goods achieved by high-quality merchandising offers us the possibility of mitigating the impact of changes in the world economy on our national economy.
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> If approximately one-third of newly produced values passes through Czechoslovak foreign trade--and this ratio will further increase in the future--the good results of international commodity exchange will become increasingly important for the effective development of the national economy. Rich political and professional experiences of prominent work collective in production and foreign trade must be used in order to make sure that production and trade through their joint effort will contribute to the fulfill- of tasks of the Seventh Five-Year Plan.

10501
CSO: 2400/190

HUNGARIAN BANK OFFICIAL INTERVIEWED ON CREDIT, FORINT CONVERTIBILITY

Warsaw POLITYKA in Polish No 2, 27 Feb 82 p 14

[Interview with Rezso Palkovitsem, vice-president of the Hungarian People's Bank by Gregorz Lubczyk; place and time not specified]

[Text] [Question] Is your bank reliable? On a list of reliable debtors recently prepared by Western banks, Hungary was in 47th place.

[Answer] Such lists are made up from the proverbial needle in the haystack and possess the merits of having very little in common. Even in the period of the 1956 counterrevolution, although life in the entire country was paralyzed, the bank met all of its obligations on time. If my memory serves me right, we have always made good grades with world banks; and for many years now we have been ranked in Category I. Due to our payments discipline we receive credits at considerably better conditions than countries that find themselves in a similar economic situation. If there were a question of acquiring new credits for a large investment in a short period of time, there certainly wouldn't be any problem.

[Question] What is the place of the People's Bank in the economic life of your country?

[Answer] To a significant degree, we are arriving at its final form. This is a little bit like making a cast: we are indeed realizing the best theoretical conceptions and ideas. It is something like a sculptor coming up with a beautiful idea, only to find that it cannot be realized because of the kind of casting equipment on hand at that moment.

The bank operates directly under the supervision of the Premier. To some extent, we participate with his office in taking up all government economic decisions. Without our participation, the Parliament would not approve economic budgetary and credit plans. Let's say, for example, that we exert a real influence on about 60 percent of the country's total investments and on 80 percent of industrial investments. We account for the implementation of current production activity with regard to finances. The basis of our work are the annual government approved guidelines for state credit policy that permit defining the volume of credits, conditions for granting credit, and the amount of interest, etc.

[Question] Your economy has earned a name as a proexport economy. How does this benefit the Bank?

[Answer] Actually, we are an open economy; export makes up over 50 percent of our national income. Foreign trade is one of our prize possessions, and we cannot allow ourselves to have it develop irregularly. The recession of the second half of the 1970's has made us very much aware of the influence this sector of the economy has on the entire economy structure.

We have created a special credit fund for enterprises to develop investments, that serve mainly the growth of export to countries in a free foreign exchange sphere. We don't give a forint without a guarantee that the goods produced will interest hard currency customers in the near future. The conditions for debtors are also rigid.

[Question] Please list the most important conditions.

[Answer] Seventy to eighty percent of future production must reach capitalist country markets. Moreover, an investment must cover the net costs of foreign exchange within 3 years at the very latest. And beyond this, the current exchange rates (and those of 2 to 3 years ago) bind the currency secured by a new investment. This direction developing exports is proving to be correct. In 1980, already 80 percent of the goods to the dollar sphere came from investments which were implemented according to the principles mentioned.

[Question] And what do you do when an enterprise does not meet its obligations?

[Answer] One needs to know that we are able to make long-term credit payments. An enterprise that maintains the conditions of the agreement receives a bonus from us--credits remain free from interest rates. In the opposite case, we even have the right to dissolve a credit agreement and the full amount of credit must be returned immediately. If this is impracticable--we have the right to seize the debtor's property.

[Question] Have any such cases occurred?

[Answer] Fortunately, no. This is not at all to say that everything is ideal. Eighty percent of the debtors do not cause us any trouble. In the most recent period more and more resources for export have been assigned to agriculture. In 1981, we assigned nearly 40 percent of the credits to state farms and agricultural cooperatives. So far, they are being repaid quite rapidly.

[Question] Is the Hungarian People's Bank independent and self-governing?

[Answer] As independent as a State organization can be. Likewise it is independent in the sense that special interests do not control the bank; rather it is controlled by the goals and tasks of the national economy. On the other hand, self-government as it is in Yugoslavia is something we don't even want to become better acquainted with. If inflation reaches an annual rate of 30 to 40 percent in Yugoslavia, what do we need with that kind of self-government?

[Question] The forint. What have you heard from your side?

[Answer] It is good currency. Taking into consideration the global inflationary processes, the success of our country consists in weathering the present storms and maintaining the value of the forint. Of course--wages have increased and prices jumped, but, in sum, the standard of living has managed to maintain itself at an undiminished level. Taking into consideration the external conditions, this is, I suppose, a greater achievement than the increased standards in past years. From the perspective of this past year, we estimate that people's real wages and incomes have not increased significantly. Plans for 1982 envisage a 1 percent increase of these incomes and wages remaining at this year's level. Hungary's market is well supplied and there are possibilities for a sensible issuance of money. And yet society's savings have increased--this is an argument that speaks for the forint, too.

[Question] In October, commercial and tourist rates of the forint are to be put on equal footing in relation to convertible currencies. This has caused a lot of speculation on the subject of creeping convertibility...

[Answer] We have set ourselves the task of standardizing both exchange rates the moment economic reform started. What became a fact on 1 October is the result of over 10 years of effort. Until 1975 we maintained the so-called forint foreign exchange. This exchange did not give the true value of exported goods and functioned mainly in statistical accounts; consequently, we abolished it in the early part of 1976. In the next 2 years, there continued to exist a 100 percent difference between the commercial and noncommercial rate, just as it was in 1968 when the noncommercial dollar was valued at 30 forints and the commercial 60. Since 1979, the gap between the two has begun to shrink rapidly. At that time, an increase in the value of the forint in the commercial sphere allowed the offsetting of internal inflation against price levels. Conversely, we have proceeded to gradually raise the commercial rate. This has meant a decrease in the value of the forint, which, in turn, has had a positive effect on Western tourists' interest in Hungary. In September of last year, the difference amounted to only 8 percent. In the course of 2½ years we have balanced the rates. Presently, the dollar is valued at 35, and not 60 forints as it was not so long ago. In other words, in the course of 13 years of reform we have increased the value of forint in relation to the dollar by about 40 percent.

[Question] What does the bank look forward to after this last operation?

[Answer] The introduction of a uniform exchange rate of the forint symbolizes a gradual development of the national economy without any shocks or disturbances, a development which must not be treated in abstraction from the profound price reforms in the years from 1979 to 1980. This step also has real significance because foreign countries see the peaceful development of our economy. Until recently, maintaining two exchange rates has tarnished our economic image and has made it difficult for enterprises to assess the actual situation. In tourism, for example, noncommercial rates were operative--how then are tourist investments to be treated? Many institutions, for example, railroads, carry out two operations: commercial and noncommercial. Financial operations connected with the transportation of goods were based on commercial rates, while the transportation of people was based on noncommercial rates. Administrative principles in these units have now become much simpler and clearer. At least it has been worthwhile to bring about the elimination of various rates.

[Question] Couldn't this have been done earlier?

[Answer] Thirteen years ago we didn't think that it would take so much time. No one, for example, foresaw the fuel and energy crises of the second half of the 1970's.

[Question] When will you declare the forint a convertible money?

[Answer] The introduction of a uniform rate is a kind of preliminary condition so that one may think of a partial external convertibility. This goal is actually in our plans. It is in the not too distant future...

9866
CSO: 2600/403

'ZYCIE GOSPODARCZE' HIGHLIGHTS PRODUCTION, IMPORT-EXPORT PROBLEMS

Trade with Capitalist Countries, Substitute Exports

Warsaw ZYCIE GOSPODARCZE in Polish No 13, 18 Apr 82 p 12

[Text] Revocation of the possibilities of obtaining credits from the second payments area states forces us to shape the turnovers with those countries on the principles of full equilibrium. An important element of this equilibrium must be, of course, the export of hard coal. However, at present, in the spring, it is obvious that this export can face considerable difficulties. In connection with these difficulties, the prompt undertaking by industry of efforts to substitute the export of coal with the export of products in whose processing coal plays a decisive role. This refers to the production of cement, caustic soda and carbide.

Foreign Exchange-Zloty Automobile Sales

Warsaw ZYCIE GOSPODARCZE in Polish No 13, 18 Apr 82 p 12

[Text] The production of passenger automobiles and many other articles is impeded by the lack of foreign exchange for the purchase abroad of often times relatively small parts, assemblies, or materials. In connection with this, it seems that the introduction of the sale of automobiles and certain other articles for payments partly in foreign exchange and partly in zlotys is worthy of consideration. The idea is that the payments in foreign currency would cover the expenditures for the import of components. This type of sale is widely conducted, for example, in Yugoslavia and it functions successfully. It is worthwhile, therefore, for us here to think about availing ourselves of those experiences.

Grain and Meat Imports, Exports

Warsaw ZYCIE GOSPODARCZE in Polish No 13, 18 Apr 82 p 12

[Text] The minimal requirement for consumable grains for the second quarter of this year [1982] is estimated at 560,000 tons. The procurement picture indicates that to reach this level of supplies, approximately 300,000 tons will be lacking. At the same time, we must reckon with the need to import approximately 360,000 tons of feed grain to uphold animal husbandry. The foreign exchange value of these needs is estimated at over 160 million dollars. Obtaining such credits, at the present time, is outright impossible. The limitation, on the other hand, on such a large scale of the import of other articles for supplying the industry would mean a tremendous slump in production--on a scale of many billion zlotys. We are forced to seek the solution of this problem via undertaking exports of expensive types of meats, so that from the revenues obtained in this manner, equivalent quantities of cheaper meat can be imported; and for the saved foreign exchange means, indispensable quantities of consumable grains can be imported. This operation can resolve the problem of supplies in bakery goods, flour and cereals but it will not, however, afford the possibility of importing the needed quantities of feed grains.

Reorientation of Industry

[Text] The accumulation of supply difficulties of our industry caused by the breakdown in the import possibilities from capitalist countries places the enterprises in the position of facing the necessity of far-reaching reorientation of their production policy. This concerns especially the following undertakings: shifting industry toward deepening cooperation with the socialist states; fuller utilization of domestic raw material resources, limiting dependence on imports from the countries of II payments area, and activating economic cooperation with those countries II payments area which have not applied any discriminatory measures against us. This last task should be treated as an important factor in overcoming the blockade imposed by the EEC states.

Cement Exports

[Text] The preliminary production estimates in the second quarter of this year [1982] indicate that it is necessary to reckon with periodic difficulties in increasing the production of many products based on our own raw material base. The assessment of the Planning Commission indicated that, for example, in the second quarter of this year [1982] it is necessary to reckon with the fact that the production of sulphur will be lower by 13 percent than a year ago, the production of lumber will fall at that [same] time by approximately 19 percent, and the production of paper by 2 to 3 percent. The production of cement will also undoubtedly be somewhat lower than a year ago. It is known, meanwhile, that the production of these articles already in the second half of last year [1981] showed falling tendencies. It appears, therefore, that some fields of production, despite the fact that they have on hand a domestic raw material and other material base, cannot surmount the falling tendencies. Overcoming this impasse is one of the urgent tasks of the economy. It is known, for example, that if the production of cement could move ahead at full speed, then with the present limiting of construction, we could earmark considerable quantities of it [cement] for export. We have on hand a surplus of fine coal whose export is faced with difficulties.

Construction Breakdown Causes

[Text] The very low degree of progress in fulfilling the first quarter 1982 residential construction annual tasks points to the great difficulties in the implementation of these tasks. The basic issue is the lack of finishing materials for whose production the import of components is necessary. Therefore, we have, at present, a large number of buildings under construction which are awaiting completion. Would it not be feasible, therefore, to delay the start of construction of new [housing] blocks and the cement saved earmarked for export in order to, in exchange, import components for the production of finishing materials? The laternative solution could be the continuation of the construction of the [housing] blocks in a raw state with the assumption that when industry overcomes the production of finishing materials without it being charged to imports, they will be completed on a mass basis. The large scale of residential construction points to the necessity of intensive work on making the production of finishing materials nondependent on imports.

CSO: 2600-P

ENERGY INDUSTRY DEVELOPMENTS DESCRIBED

Belchatow Mining-Power Complex

Warsaw ZYCIE GOSPODARCZE in Polish 6 Sep 81 p 8

[Article by Jerzy Paszkiewicz: "The Coking Industry in Belchatow"]

[Text] The largest Polish fuel-energy investment at present is the Belchatow mining-power complex. The natural deposition of strata divides the deposits into three parts: Belchatow, Szczercow and Kamiensk. The Belchatow deposit is already being mined. At the moment the Belchatow I mine and power plant are under construction. The first production from the mine in 1980 was to be 500,000 tons of coal, and in 1985 coal output was to be 40 million tons. Twelve power units, each rated at 360 megawatts (MW), are to be installed in the power plant, for a total capacity of 4,320 MW, which should make it possible to ultimately produce approximately 26.7 billion kilowatt-hours (kWh) of electric energy a year. By way of example, in 1979 domestic production of electric energy amounted to 117.5 billion kWh, and the generating capacity of all power plants totaled 24,785 MW. The first power unit was to have been put into operation in 1980, but there was a considerable delay. This was to have been followed by the Szczercow strip mine and the construction of the Belchatow II power plant with six power units of 360 MW each (2,160 MW total).

Thus far in Poland brown coal is used for one purpose only, as fuel for large power plants (Konin, Adamow, Turoszow, Patnow). This single-directional use of brown coal, which is presumable justified by the country's fuel-energy needs, is not convincing. A large part of the known reserves of brown coal in Poland have properties which are useful in chemical processing. The result of thermochemical and chemical processing of brown coal are valuable substances and raw materials for industries such as: organic, plastics, production of fertilizers, pesticides, and also liquid fuels, town and chemical gas, smokeless fuel, and others. At the present state of research and engineering, brown coal chemical processing technologies are already being used which make these processes profitable.

The directions in the development of extraction and mining of brown coal in the world show a steady growth tendency in the production of processed products: gas, heat, electric energy, briquettes, for the direct needs of users, and: high-temperature tar; semi-coke; light, engine and fuel oils; bitumens, phenols, asphalt, etc., that is, raw materials and intermediate products for the requirements of the chemical industry and other branches of the economy. This was dictated by more efficient processed energy sources, the convenience of their use, the raw-materials needs of industry, and environmental protection, particularly in highly populated regions.

The Experience of Our Neighbors

The GDR has a great deal of industrial experience in the field of chemical processing of brown coal (with properties similar to that of Polish coal). In 1979, 256 million tons of this raw material was mined by our western neighbor, i.e., 5.2 tons of standard fuel per one inhabitant, while in Poland the combined output of hard coal and brown coal in 1979 amounted to 239 million tons, i.e., 5.4 tons of standard fuel per inhabitant.

In the GDR a number of installations for gasification, coking and extraction of brown coal are operated. Modern methods of processing this raw material are being used in the "Schwarze Pumpe" Works. This Works, which processes approximately 30 million tons of brown coal yearly, is comprised of:

--a gasification plant producing 3.2 billion cubic meters of gas, equipped with 24 gas generators of the Lurgi type,

--two coking plants, producing 1 million tons of coke annually,

--three briquetting plants, producing 9 million tons of briquettes annually,

--a complex of two electric power and heat generating plants with 2x100 MW countercurrent turbines and an electric power plant with 4x200 MW units, which provides for coordinated thermal management.

The works has a fuels institute, design offices, an experimental plant, etc. And what do we have? In no complex producing brown coal in Poland do we have this type of coordinated management, and what is worse, neither is it being planned for the Belchatow mining-power complex.

Planning the entire output of brown coal from the Belchatow deposit exclusively for power plant needs is a mistake. If this "mistake" is actually implemented, Belchatow will be lost forever for the chemical processing of brown coal. The power plant, with its 4,320 MW, must operate continuously and several units will not be taken out of operation to make up the deficiency in chemical processing. It is interesting that in the "Scharze Pumpe" Works, out of 30 million tons of yearly production of brown coal, only one-third of the yearly output is allocated for the direct production of electric energy, and two-thirds for the production of processed products.

At the present time, in connection with the intensifying petroleum crisis, the industrialized capitalist countries (United States, FRG, England, Republic of South Africa, Australia) and the socialist countries (GDR, Czechoslovakia), are increasing the chemical processing of coal and are expanding research on its processing. This is not simply a matter of the over fivefold (since 1973) increase in crude oil prices on the world market. The future of the coking industry derives from the fact that according to the latest estimates there will be enough crude oil in the world for scarcely 27 years, unless there is a drastic drop in consumption or new sources are discovered. However, world coal reserves, suitable for industrial use at the present level of technology, are sufficient for approximately 200 years. These forecasts, as well as the present state of knowledge and technology, allows us to say that the importance of coal as a chemical raw material will grow tremendously.

Our Meager Coking Industry

In the area of hard coal chemical processing thus far we have the so-called "preliminary phase" in the coking industry, during which we at first obtain the derivative products: coke, high-temperature tar, benzol, ammonium sulfate, and coke-oven gas. Important economic benefits, however, are not obtained until later in the processing of these products. The organic chemical industry requires, as raw materials, many components of tar and benzol (e.g., benzene, xylene, toluene, phenol, naphthalene, anthracene, etc.).

So far, we do not know how to make efficient use of the products of the coking industry. We use scarcely 15 percent coal-derivatives in our chemistry. The management of high-temperature coking tar and benzol is especially poor. Large amounts of unprocessed tar are exported at low foreign-exchange prices, or we burn it in metallurgical furnaces, and we import its chemically processed ingredients at high prices. We import, also for foreign-exchange, benzene obtained from the processing of benzol, naphthalene, anthracene, anthraquinone, etc. This import costs us 30 to 40 millions of dollars annually. One of the directions of hard coal chemical processing should be the processing of coking products. This processing should be developed in Silesia, where we have our coking plants. Czechoslovakia has a lot of experience in this area. Our southern neighbors, in Velke Mezirici (Moravia), have had for over 20 years now a large industrial plant specializing exclusively in the processing of high-temperature tar and... it is difficult not to be envious of this.

However, the important chemistry of coal is, above all, its gasification and hydrogenation. Processing coal into gas makes it possible to improve efficiency in utilizing the energy of coal, and it also eliminates the transport of coal, and thus relieves the railroad lines, improves the habits of energy consumption, protects the natural environment, and for the long term, makes it possible to process it chemically into many valuable products.

Many Prospects, But...

There is a large shortage of natural gas in Poland. In 1983 it will amount to 2.9 billion cubic meters, and in 1985 it will be as much as 5.5 billion cubic meters. The potentials of a growth in the import of natural gas are, at the present time, limited. An increase in natural gas imports from the Soviet Union is linked with investments in the regions where it is produced and with sharing in the large costs of constructing transmission gas pipelines from Siberia. The import of liquefied gas from the North Sea region or from Algeria would entail considerable foreign-exchange costs, and in the case of Algeria, investments also in convertible currencies, which would make the price of this gas higher than the price of gas from coal. We must, therefore, extract or produce gas for our own needs by ourselves. Solving this problem in Silesia by building a large hard coal gasification plant, e.g., with a productivity of 4 billion cubic meters a year, is not possible, or at least very problematical, for the following reasons:

First: production of gas from coal is dependent on additional output of coal for gasification purposes. Approximately 7.3 million tons of hard coal is needed to produce 4 billion cubic meters of gas. Where, in Silesia, will we get this additional amount of coal? We know that there is not enough coal for current power requirements, foreign-exchange export, agriculture, and population needs. The mining ministry determined in 1980 that there is a fuel shortage nationally of 10-12 million tons. Nor will the situation be better in the future.

Second: gasification of coal in Silesia is dependent on its extraction from deposits located on the eastern side of the Upper Silesia Basin. The coal there has such a high sulfur content that to use it without chemical processing would cause serious ecological damage. But this would require large, additional investment outlays, which under the present and future economic conditions we cannot permit.

Third: the air in Silesia is polluted to the maximum degree. We have there a large concentration of plants that burn hard coal and coke, which causes emissions into the atmosphere of dust, and sulfuric and nitrogen oxides. The dust and sulfur emissions endanger the health of the people and the natural environment.

Fourth: there is a water shortage in Silesia. The coal gasification industry is water-intensive and requires large amounts of this resource. For example, approximately 13 million tons of water is needed to produce 4 billion cubic meters of gas.

And finally, fifth: hard coal is our very valuable export item. In developing the production of gas on a hard coal base we are depriving ourselves of the ability to export it, and thus depriving ourselves of the foreign-exchange revenues needed for the indispensable import of raw materials and repayment of foreign indebtedness.

The hydrogenation of hard coal for purposes of producing liquid fuels (synthetic gasoline) in Silesia is also out of the question. Approximately 2.5 kilograms of coal would have to be consumed to produce 1 kilogram of liquid fuel. Thus, to produce 8 million tons of "coal petroleum" (about half of our petroleum imports in 1979), we would have to mine an additional 20 million tons of coal. We cannot achieve such an increase in output in Silesia, and the Lublin Coal Basin is under construction and the development of a coking industry there will be possible only in the very distant future. But Poland needs gas; briquettes; light, engine and fuel oils; and phenols, right now.

Moreover, coking of hard coal in Silesia can be developed only unidirectionally (gasification or hydrogenation) and on a relatively small scale. The construction there of a large power-coking works cannot be considered in view of the reasons already cited, and also because of other restrictions (the transportation barrier, mining damage, and employment).

Brown Coal Possibilities

Since the coking of hard coal in Silesia is not likely, brown coal remains available. We have the Turoszow, Konin-Turek and Belchatow basins. Recoverable and nonrecoverable brown coal reserves in Turow are not large. They amount to approximately 0.9 billion tons, while in Belchatow there are 2.1 billion tons. The Turoszow deposit has been mined since 1956, i.e., 25 years. Approximately 400 million tons, i.e., 44 percent of the reserves have been mined by now. The Turoszow Basin lies in the southeast section of Poland, near the GDR border. In developing the coking industry in Turow, the noncentral location would make it necessary to haul the briquettes, coke, oil, etc., produced there by railroad to the center of the country and to the northern and eastern regions, and the transmission gas pipelines would have to be farther extended. The Konin-Turek Basin is even less abundant. There are known difficulties there in view of the insufficient productivity of the mines in relation to the consumption of brown coal in the Konin, Adamow and Patnow power plants.

Finally, there is Belchatow. The reserves of the Belchatow deposit are large, at this time are substantially prepared for industrial exploitation and if wisely used should last for many decades. In the meanwhile, it is anticipated that in view of the economic life of a power plant, coal output from the Belchatow field should reach 40 million tons a year, which corresponds to an operation period of 30 years. At the same time, the entire output from the Belchatow and Szczercow deposits was allocated exlusively for the needs of two power plants with a combined generating capacity of 6,480 MW. Filling up of the reservoir, which will arise in the after-mining excavation, with water, will take 20 to 30 years. It should therefore be assumed, that with the moment that the reservoir is completely filled with water, the electric power plants will simply come to a halt. It thus appears that the generating capacity of the power plant in Belchatow was planned too high in relation to the planned time-period of the mining of the deposits, and the life of the power plant was set for too short a period. Specifying for Belchatow a 20-30 year period of power plant operation and brown coal mining and not considering chemical processing there is a waste of investment outlays as well as a waste of coal resources, which should serve several generations. Under no circumstances can we allow this to happen.

What Should We Do?

First of all, we must restrict the investment mania for bigness and apply common sense to the Belchatow matter. We must conduct studies and comparative analyses on reducing the generating capacity and limiting the consumption of brown coal for the needs of the Belchatow I power plant and on providing a part of the deposit reserves for the needs of chemical processing. For example, the Belchatow I power plant could have six units, 360 MW each, i.e., a total capacity of 2,160 MW. This will result in a lower production of electric energy, which is also very much needed in Poland. But until these power units in Belchatow are built (for which we have about 4 years time), the additional indispensable electric energy can be obtained from other sources. For example, by improving the quality of the coal fines delivered to the power plants by enriching them, homogenizing coal for the power industry, increasing the power availability of the power plant, eliminating needless ash accumulation, improving the periodic overhauls, etc.

Second, we should not build the Belchatow II power plant and the resources of the nearby brown coal deposit should be treated as future reserves for the requirements of the power industry and the coking industry. Third, following the example of the GDR, we should begin investing in gasification, chemical processing, coking and briquetting plants.

If we were to allocate the investment means thus saved for the construction of a briquetting plant in Belchatow, producing, for example, 6 million tons of briquettes a year, then, with Belchatow's central location, these briquettes could be sold to supply agriculture and the population, and the hard coal that would be saved could be exported. Nothing would be lost here, because the briquettes are an intermediate product for further chemical processing. A brown coal gasification plant, producing, for example, 3 to 4 billion cubic meters of gas annually, could also be built in Belchatow, which would greatly alleviate the deficit in our natural gas balance. Next, a low-temperature carbonization plant should be built, producing tar, light oils, semi-coke and gas, as well as a coking plant and plants for processing high-temperature tar. Thus a comprehensive power-coking works would be built in Belchatow, in which an additional complex of two electric power and heat generating plants with countercurrent turbines could ensure coordinated thermal management.

Such action is also advisable from the standpoint of environmental protection considerations. A great deal is being written about this, therefore I will only add that no one is able to foresee how the natural environment will be affected by the construction of such a giant as Belchatow I and II, with a total capacity of 6,430 MW.

*

The causes of Poland's socioeconomic crisis include: a mania for large investments, lack of a long-range view on economic development, poor planning, ineffective management, and failure to consider indigenous raw materials possibilities. While we, from the time we stopped producing synthetic gasoline in the Oswiecim Chemical Plants, did very little in developing our own coking technologies, other countries outdistanced us in this field by whole decades.

Let us face the truth squarely. We are backward in the chemical processing of brown coal and there is a shortage in our country of dyes, medicines, polyesters, synthetic surface-active agents, rubber, etc.

We must, therefore, include chemical processing in the Belchatow brown coal mining program as quickly as possible. The chemical processing of brown coal, and especially low-temperature carbonization and gasification, makes for more efficient and effective entrapment of sulfur than does equipment in power plants and ensures that many valuable raw materials of an anti-import and pro-export nature are obtained. It should be added that if we do not develop brown coal coking in the immediate future, the technological gap that will arise between Poland and the developing countries in this area will become so large that we will not be able to close it later.

Energy Balance, Forecast

Warsaw TRYBUNA LUDU in Polish 5 Apr 82 p 2

[Interview with director Lech Tarnawa from the Main Inspectorate of Power Management, by Adam Hollanek; date and place not given]

[Text] Fortunately, the winter broke no 100-year records, nevertheless the situation in our power industry continues to be far from ideal. How drastic power interruptions this past winter were avoided, what is the present status of coal management, why is it frequently in short supply for private purchasers, and what will be the situation in the fall--these are the questions answered by director Lech Tarnawa of the Main Inspectorate of Power Management.

[Question] Adam Hollanek: Was this past winter a threat to our power industry? It apparently caused no great difficulties.

[Answer] Lech Tarnawa: Winter came early and was not at all as mild as it may have appeared. It was a long winter. Also, when last year's premature freezes began our **coal** output was disastrously low. But despite this, we benefited from the experience of the 1979-1980 winter, which broke a 100-year record. We accumulated stocks with maximum care. In addition, very strict allotments were instituted for the consumption of heating fuel in industry, under penalty of heavy fines. Thus no one could be wasteful. No significant power disruptions were recorded in the important plants, which operated at full steam. Nor were there any serious failures in the heating of residential settlements, which the power engineers always fear greatly for it threatens human life and housing property. When heating is interrrupted, little can be done. Heating by means of electrical heaters overloads the network. We were able to come out of the difficulties of this winter intact.

[Question] And the situation in the summer and fall? What are the power forecasts for the remaining quarters of this year?

[Answer] In the area which is of greatest importance to the whole economy--coal supplies, especially at the present level of output--the forecasts are favorable. Particularly for industry. Coal stocks in the power industry at the end of March amounted to 1,700 thousand tons. By 1 April they will amount to 1,400 thousand tons, whereas previously they fell even below 900,000 tons.

[Question] If there is enough coal then why do many private purchasers have trouble getting it? Our economy, our agriculture, constantly suffers because of this.

[Answer] This is true. Unfortunately, this is the result of the mechanization of the mines, the mechanization of the mining output. That is, increasingly fewer grades of coarse coal are being mined. This could be remedied by developing briquetting plants, which make the coarser grades by compacting the small coal into lumps. We do, anyway, briquette rather a large amount, 1,600 thousand tons of coal, but we should briquette at least twice that much. Than the needs would be fully satisfied. And this is profitable. In short, we will make every possible effort to bring supplies up to full norms.

[Question] Will the shortage of liquid fuels continue? How much petroleum will we actually import?

[Answer] In 1979 we imported almost 17 million tons. This included 3.5 million from the second payments area [capitalist countries]. This year we cannot count on more, at least for the time being, than slightly under 13 million tons. Naturally, the differences in the size of imports are reflected also in the production of gasoline. Last year, from both our own production and from imports, there were 3,250 thousand tons of gasoline. This year there should be less, unless some additional transactions for the purchase of a certain amount of liquid fuels go through. At the same time, we know that transportation, as well as some fields of industry, are feeling the effects of the deficiencies in petroleum production.

[Question] Is it true that last year the amount of gasoline sold to private vehicle useres was larger than that delivered to socialized transportation?

[Answer] True. Last year was, in general, surprising in the consumption of gasoline. The socialized economy, applying severe conservation procedures, consumed 1,400 thousand tons. But private consumers used 1,750 thousand tons. Each year the requirements in this area grow by approximately 150,000 to 200,000 tons. Therefore, rationing is essential. In April, the system of liquid fuel sales will remain unchanged.

I think that despite everything there is still room for improvement in socialized transportation, if only by better organization of traffic, elimination of "deadheading", improvements in highway engineering, etc., but this is another subject and another competence.

9295
CSO: 2600/486

ECONOMIST SEES LABOR PRODUCTIVITY AS SOCIOECONOMIC KEY

Warsaw RZECZPOSPOLITA in Polish No 21, 6-7 Feb 82 p 4

[Article by Prof Stanislaw Nowacki, Economist: "To Return Dignity to Human Labor]

1.

[Text] Despite superficial judgments, it is precisely martial law which insistently poses a question about tomorrow, what will be our individual and collective fate, under what social, political and economic conditions we will work and live, how we will build a cooperative and affluent common home, so we can manage our fraternal relations with near and distant neighbors with a feeling of Polish pride and dignity. These and similar questions are asked by everyone who is concerned about the rate and welfare of our [socialist] Community whose historical location in the center of Europe between the Baltic and Tatras, between the Bug and Odra Rivers is satisfactory. A society does not change the locale of its national existence, like some of its patriotic members.

In connection with the above, the question "What kind of Poland?" must reach to the deepest levels of patriotism and its answer requires deep reflection taking into account the realities of the 1980's.

2.

The premises upon which the imposition or the martial law were based are accepted with fuller and more universal understanding, despite the fact that this condition is accompanied by numerous burdens for everyday life and a suspension of some civil rights. Martial law interrupted a developing process of anarchy in social, political and economic life and prevented the revision of the constitutional system in Poland; it protected us from the exploitation of our internal problems as an instrument for solving more general issues, aiming to change the political status quo in Europe.

Martial law, breaking the anarchic process of social, political, and industrial life, singularly introduces elementary law and order to establish basic ties in society and the economy on the basis of constructive cooperation, broken as a result of antagonizing of society, prepared for a sharp confrontation.

This constructive cooperation is necessary in order not to petrify the existing social, political and economic structure, but to change them by its own forces, adapting them to new social possibilities and aspirations. This constructive cooperation results from realistic and permanent national understanding.

There are authentic problems in contemporary Poland but I believe and for a good reason that they will be solved satisfactorily on the basis of the constructive social cooperation. It is impossible simply to continue the present methods of functioning of society, the state and the national economy. The qualitative socio-economic changes that occurred in our country in the last few years require similar changes in the methods of functioning of the political authorities, society and its economy. These changes are mutually determined and for that reason, qualitative changes in the economic sphere have important meaning.

3.

Economics is governed by its own objective laws. Therefore, economic activities must be shaped in agreement with these objective laws. That is relevant equally to consumer management, the industrial enterprise, and public management.

Positive effects of this activity arise from direct functional dependence on: natural resources; possession of machinery, equipment, and energy by the economy; intellectual resources of labor; and professional competence in their effective use. All of these material and personal factors are on a high enough level in our country to achieve effects comparable with other countries.

But we are in a deep crisis. One of the main, aside from political and social, causes of the breakdown was an incompetence in economics, magnified by good intentions and awakened aspirations. Because of this, this economic "building" had to fall down. It was accompanied or perhaps preceded by a political and social breakdown, in the form of a crisis in the discharge of authority and of social protest.

Martial law provides simple, elementary laws of social order but it does not solve any basic social, political or economic problems.

But an unambiguous determination by General Jaruzelski is the result of an awareness of the need for qualitative changes in methods of functioning of the state and its economy on the basis of the democratic order of the socialist type.

4.

The concept of economic reform projects changes in mechanisms of growth and functioning of the national economy. Its implementation, began widely on 1 January 1982, is supposed to ensure:

a) a new articulation of economic goals, resulting from the authentic social needs;

b) a mechanism of economic growth, allowing an effective and elastic material structure of national economy;

c) an economic functioning which will raise human labor to a level of the most important factor in the economy.

The practical implementation of the new economic mechanism encounters numerous limitations. A deep imbalance, the breakdown of internal economic ties, an unbalanced economic structure and the external Western economic noose together seriously limit the realization of a new economic mechanism. There is an awareness of the role of these limits. Despite that, as a result of political courage and determination, the particularly important blocks of this mechanism are successively put into practice. This is accompanied by sharp reactions. One of these sharp, lately revealed reactions is the policy of very high prices for durable goods imposed by enterprises. This undesirable economic phenomenon requires a correction of the mechanism. Probably there will be other undesirable symptoms. The removal of their causes should be an action regarded as normal, without deviating from the accepted path, determined by the concept of the new economic mechanism. Here consistency becomes a value that cannot be overestimated.

5.

The ultimate economic mechanism will be the original mechanism of the growth and functioning of the Polish socialist economy. It will integrate three basic factors of the development and functioning of the social economy, which are:

a) central management of the national economy;

b) business management combined with a market mechanism;

c) worker and consumer self government.

There are known examples of a functioning socialist economy integrating both central management and business-market management. There are also examples of a functioning national economy, combining business-market management and self-government. The Polish economy, I claim, may develop and function effectively only when the factors of central planning, business management, and self-government can be integrated sensibly. The authenticity of this integration creates a chance for active and positive acceptance of this mechanism by society, and at the same time shaping of an effective economy based on a democratic order of the socialist type.

6.

The basis and the only source of social well-being is rational and individually and socially useful and effective work. The threat to the accepted sense of work, for its usefulness and effectiveness creates a severe danger for the economic basis of our national existence. The symptoms of such danger appeared in our country in a sharp form. They are a result of certain historical contexts, but mainly of the popular but mistaken idea that from its founding the socialist system is able to solve all problems, and also from the point of view of solutions in the area of mechanisms of the functioning of an economy, violating an elementary law of economics that it is possible to receive more than is given. The awareness of this obviously mistaken interpretation of economics that "you must work out at least as much as you receive" operated on individual, social and professional groups and national scales. That is the reason, in my opinion, not only for ineffective exploitation of our national productive capacities but also a source of numerous frustrations, because work does not create a possibility of satisfaction of need for creativity and self-realization, and the future is hopeless. Therefore, it is absolutely necessary to return to a high regard for work; the new economic mechanism creates a chance for this. This chance will transform itself into reality if it will be effectively supported by democratic political mechanisms and objective social mechanisms. A thrifty Poland is Poland of the future.

9031
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DATA ON WAGE-PRICE RELATIONSHIP PUBLISHED

Warsaw ZYCIE GOSPODARCZE in Polish 5 Apr 82 p 2

[Article by Ch. M.: "Wage-Price Ratios"]

[Text] If the entire wage were spent for bread, in 1960 the average wage-earner could have purchased 690 loaves weighing 0.8 kilograms each; in 1970, 559 loaves; in 1980, 864 loaves; and in 1982, 662 loaves. The purchasing power of wages was also calculated using many other articles and consumer services by way of illustration.* The author of these calculations and the interesting conclusions drawn from them is the Department of Living Conditions in the Main Statistical Office. Larger excerpts from this rather extensive report, we believe, deserve to be published in WIADOMOSCI STATYSTYCZNE [Statistical News]. We present only a part of this information in Table 1.

The method used in estimating prices and wages in 1982 requires some explanation. Namely, in the case of food items, the average prices for all of 1982 were used, including the 1 February price increases. However, in the case of other consumer articles and services, where only the proposed price changes are known, it was assumed that the price increases would take place in mid-year.

Average wages in the socialized economy in 1982 were estimated at 9,951 zlotys, based on their fourth-quarter 1981 level (7,956 zlotys) increased by 9 percent (716 zlotys), and by compensation (1,279 zlotys).

The year 1981 is omitted in Table 1. Nominally, it was possible during that year to purchase the largest number of different articles and services (had it been possible to find them on the market!). However, the possibility of purchasing, in trade, for an entire month's wage, 134 kilograms of precooked Krakowska sausage, as the calculations shown would indicate, was illusory, because during some months of that year even the ration-card allotments could not be filled.

The estimates show that the purchasing power of wages in 1982 will be equal to the purchasing power of wages in 1972-1973. A closer examination of the relative indicators of the purchasing power of wages in the individual years, shows that in the case of food articles, particularly meat and meat products, alcoholic beverages, and clothing, about the same amount can be bought for the entire wage in 1982 as was possible in the 1960's. A smaller drop in purchasing power (i.e., a regression of 5 years or less) occurred in the case of cigarettes and services. It appears also from the calculations discussed that in 1982 it will be possible to purchase for the wage also about the same amount of some articles, for example, vegetables and fruits.

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*A study was made of almost 90 percent of the food items (from the so-called basic basket), almost 95 percent of the alcoholic beverages and tobacco products, over 73 percent of the nonfood items, and over 48 percent of the services--which constitutes, it would seem, a rather representative sample.

Table 1. Purchasing Power of Average Wage in the Socialized Economy Expressed in Amounts (Kilogram, Each, Liter, Thousands) for Selected Consumer Articles and Services

Item	Unit of Measure	Years			
		1960	1970	1980	1982
Pork roast	1 kg	35	34	64	27
Plain sausage	1 kg	43	43	132	52
Fresh carp	1 kg	60	62	96	62
Creamery butter	1 kg	24	35	84	41
Fresh eggs	each	678	798	1,376	663
Cottage cheese, chunk, low-fat	1 kg	186	149	482	184
Granulated sugar	1 kg	130	213	551	216
Plum jam	1 jar 500 g	211	217	827	206
Potatoes	1 kg	1,122	1,146	1,058	1,032
Men's 2-pc suit, 100 percent worsted wool	each	0.8	1.3	1.5	1.2
Men's low-quarter shoes, foam-rubber soles	pair	8.7	12.4	16.5	12.4
Upholstered armchair, varnished wood frame	each	2.3	3.3	4.3	3.3
Electric washing machine SHL	each	0.8	1.4	3.6	1.4
Black-and-white television set	each	0.2	0.3	0.9	0.6
Men's tourist bicycle	each	1.6	1.8	3.3	1.6
Fiat 125p automobile	each		0.01	0.08	0.02
Motor gasoline	1 liter	325	447	362	382
Unflavored vodka, 40 percent	0.5 l	43	41	48	30
Laundering of bed linens (no rush)	1 kg	164	279	386	324
Weekly newspaper, POLITYKA type, (thus also ZYCIE GOSPODARCZE)	each	780	1,118	964	498

The report also contains an estimate of the real value of the average wage in the socialized economy calculated on the basis of 1960 fixed prices. The corresponding amounts for selected years are shown in Table 2.

In the last few years the real wage was, and we have already called attention to this in other publications (see "Fewer Illusions", ZYCIE GOSPODARCZE, No 4, 1982), obviously an increasingly less reliable indicator, because prices truly were relatively low in comparison with wages, but there were no goods.

Table 2.

Item							
Nominal wages in zlotys	1,560	1,867	2,235	3,783	5,786	7.250	9,951
Cost of living index: 1960 = 100	100	101.2	120.2	135.5	183.4	235.1	428.9
Real value of average wage in zlotys: 1960 prices	1,560	1,677	1,852	2,791	3,071	3,084	2,347

It is worth noting also that 1982 prices were used as the basis for the estimates shown in Table 1, but 1960 prices were used in estimating the real wages shown in Table 2. However, the results do not differ greatly.

9295
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SPECIAL CURRENCY EXCHANGE RATES PUBLISHED

Warsaw TRYBUNA LUDU in Polish 5, 13 Apr 82

[5 Apr 82 p 9]

[Text] Announcement of Exchange Rates Table No 14/82, effective 5 April 1982, by Stanislaw Majewski, president, Polish National Bank, Warsaw, on 5 April 1982.

I. Foreign-currency exchange rates in zlotys for countries of the first payments area [socialist countries] for commercial and noncommercial payments in Table No 6/1982, dated 8 February 1982, remain unchanged.

In purchases of travelers' checks for rubles, issued by the USSR Foreign Trade Bank and payable outside the USSR in the currency of the country where cashed, an exchange rate of 11,628.70 zlotys per 100 rubles is applied.

II. Foreign-Currency Exchange Rates in Zlotys for Countries of the Second Payments Area [Capitalist Countries]

[Table on following page]

Exchange Rates Table No 14/82

				Foreign Exchange		Money		
Country	Curr Symb		Currency	Purchase 3	Sales 5	Purchase 1	Sales 2	Average 6
Saudi Arabia	771	1	rial***	24.55	24.79	--	--	24.67
Australia	781	1	Austral.dollar	88.29	89.17	86.96	90.50	88.73
Austria	786	100	schillings	495.28	500.26	487.81	507.73	497.77
Belgium	791	100	francs	184.34	186.20	181.56	188.98	185.27
Denmark	792	1	kroner	10.19	10.29	10.04	10.44	10.24
Finland	780	1	markka	18.13	18.31	17.86	18.58	18.22
France	793	1	franc	13.44	13.58	13.24	13.78	13.51
Greece	724	100	drachmas	133.79	135.13	115.96	137.15	134.46
Spain	785	100	pesetas	79.16	79.96	77.97	81.15	79.56
Holland	794	1	florin	31.40	31.72	30.93	32.19	31.56
India	543	100	rupees***	898.81	907.85	--	--	903.33
Ireland	782	1	pound***	120.89	122.11	--	--	121.50
Japan	784	100	yen	34.17	34.51	33.65	35.03	34.34
Yugoslavia	718	100	dinars	173.81	175.55	150.65	178.17	174.68
Canada	788	1	Canad.dollar	68.36	69.04	67.33	70.07	68.70
Kuwait	770	1	dinar***	293.17	296.11	--	--	294.64
Lebanon	752	1	pound	17.18	17.36	16.92	17.62	17.27
Libya	651	1	dinar***	283.52	286.36	--	--	284.94
Luxembourg	790	100	francs	184.34	186.20	181.56	188.98	185.27
Norway	796	1	kroner	13.71	13.85	13.50	14.06	13.78
Portugal	779	100	escudos	117.58	118.76	101.91	120.53	118.17
FRG	795	1	mark	34.80	35.14	34.27	35.67	34.97
United States	787	1	dollar*	83.95	84.79	82.68	86.06	84.37
Switzerland	797	1	franc	43.46	43.90	42.81	44.55	43.68
Sweden	798	1	kroner	14.13	14.27	13.92	14.48	14.20
Turkey	627	100	pounds	57.54	58.12	49.87	58.99	57.83
Great Britain	789	1	pound**	149.65	151.15	147.39	153.41	150.40
Italy	799	100	lira	6.36	6.42	5.51	6.52	6.39

*Valid also in clearing accounts with the following countries: Bangladesh, Brazil, Ecuador, Greece, Iceland, Kampuchea, Colombia, Lebanon, Pakistan, Peru and Turkey.

**Valid also in clearing accounts with the following countries: Nepal and Pakistan.

***The Polish National Bank does not purchase money in these currencies.

[13 Apr 82 p 7]

[Text] Announcement of Exchange Rates Table No 15/82, effective 13 April 1982, by Stanislaw Majewski, president, Polish National Bank, on 13 April 1982.

I. Foreign-currency exchange rates in zlotys for countries of the first payments area [socialist countries] for commercial and noncommercial payments in Table No 6,1982, dated 8 February 1982, remain unchanged.

In purchases of travelers' checks for rubles, issued by the USSR Foreign Trade Bank and payable outside the USSR in the currency of the country where cashed, an exchange rate of 11,652.10 zlotys per 100 rubles is applied.

II. Foreign-Currency Exchange Rates in Zlotys for Countries of the Second Payments Area [Capitalist Countries]

[Table on following page]

Exchange Rates Table No 15/82

			Foreign Exchange		Money		
Country	Curr Symb	Currency	Purchase 3	Sales 5	Purchase 1	Sales 2	Average 6
Saudi Arabia	771	1 rial***	24.52	24.76	--	--	24.64
Australia	781	1 Austral.dollar	88.22	89.10	86.89	90.43	88.66
Austria	786	100 schillings	496.25	501.23	488.77	508.71	498.74
Belgium	791	100 francs	184.66	186.52	181.88	189.30	185.59
Denmark	792	1 kroner	10.20	10.30	10.04	10.46	10.25
Finland	780	1 markka	18.16	18.34	17.88	18.62	18.25
France	793	1 franc	13.40	13.54	13.20	13.74	13.47
Greece	724	100 drachmas	132.88	134.22	115.17	136.22	133.55
Spain	785	100 pesetas	78.79	79.59	77.61	80.77	79.19
Holland	794	1 florin	31.45	31.77	30.98	32.34	31.61
India	543	100 rupees***	896.74	905.76	--	--	901.25
Ireland	782	1 pound***	120.80	122.02	--	--	121.41
Japan	784	100 yen	33.87	34.21	33.36	34.72	34.04
Yugoslavia	718	100 dinars	172.36	174.10	149.40	176.69	173.23
Canada	788	1 Canad.dollar	68.47	69.15	67.43	70.19	68.81
Kuwait	770	1 dinar***	293.03	295.97	--	--	294.50
Lebanon	752	1 pound	17.22	17.40	16.96	17.66	17.31
Libya	651	1 dinar***	284.07	286.93	--	--	285.50
Luxembourg	790	100 francs	184.66	186.52	181.88	189.30	185.59
Norway	796	1 kroner	13.72	13.86	13.51	14.07	13.79
Portugal	779	100 escudos	116.82	118.00	101.25	119.76	117.41
FRG	795	1 mark	34.85	35.21	34.33	35.73	35.03
United States	787	1 dollar*	84.12	84.96	82.85	86.23	84.54
Switzerland	797	1 franc	42.94	43.38	42.30	44.02	43.16
Sweden	798	1 kroner	14.14	14.28	13.93	14.49	14.21
Turkey	627	100 pounds	57.57	58.15	49.90	59.02	57.86
Great Britain	789	1 pound**	148.12	149.60	145.88	151.84	148.86
Italy	799	100 lira	6.35	6.41	5.50	6.51	6.38

*Valid also in clearing accounts with the following countries: Bangladesh, Brazil, Ecuador, Greece, Iceland, Kampuchea, Colombia, Lebanon, Pakistan, Peru and Turkey.

**Valid also in clearing accounts with the following countries: Nepal and Pakistan.

***The Polish National Bank does not purchase money in these currencies.

9295
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PURCHASING POWER OF CURRENCY COMPARED, ANALYZED

Warsaw RZECZPOSPOLITA in Polish No 47, Mar 82 p 6

[Article by C: "Real Value of Wages Now and 10 Years Ago--Results of an Analysis Conducted by State Price Commission"]

[Text] (PAP)--To assess the real value of wages, it is important to consider the quantity of products that can be purchased for a wage received, rather than the prices of particular products. If, for example, there is a very substantial price increase and it is accompanied by a proportionately higher increase in wages, then the value of [real] wages ultimately increases as well.

A highly simplified test of the purchasing power of wages is generally done by older persons: they calculate how much meat, or how many pairs of shoes or suits an average salary could buy decades ago and what quantities it can buy now. Comparisons of this kind at the same time indicate changes in price ratios involving different commodity groups, showing, for example, whether food has become relatively more expensive than clothing or other durable goods, or conversely. Following the recently implemented price reform, calculations of this type were made by the PKC [State Price Commission]--currently, the office of the minister of price affairs.

The comparison involved average net nominal wage and minimum wage in the state sector of the economy in 1972 and 1982. Thus, the point of reference is the beginning of the period when a vigorous policy of income and wage growth was being implemented and was expected to become a major mechanism for accelerating economic development. The year 1982, on the other hand, began in Poland in a profound economic regression.

The 1972 net average monthly wage of 2,511 zlotys used in the PKC analysis was calculated on the basis of the 1973 statistical yearbook. Net average 1982 wage was accepted to be 9,235 zlotys. It was computed by augmenting the average fourth-quarter wage in 1981, 7,956 zlotys according to GUS [Main Statistical Office] data, with the average compensation for price increases in basic foodstuffs, heating fuel and energy amounting to 1,279 zlotys in the state sector.

The minimum wage for state sector employees was 1,000 zlotys in 1972. Currently, it is 3,300 zlotys. This wage was increased by the addition of the compensation for raised prices of basic foodstuffs, heating fuel and energy amounting to 1,450 zlotys for bottom earners plus the compensation granted because of increased prices of baked, dairy and cereal products. Thus, a minimum wage together with compensations currently totals 4,910 zlotys.

Household budgets were markedly affected by increased food prices. It is, therefore, worthwhile to start a presentation of the PKC calculation results from basic food articles. Regarding bread, a computation of the purchasing power of the average nominal net pay would be as follows: in 1972, average pay would buy 628 loaves of bread (0.8 kilograms) at 4 zlotys each. Now that the price of a loaf went up to 16 zlotys, we can buy only 577 loaves for the average monthly pay, that is, its purchasing power decreased by 51 loaves in the case of bread. A decrease in the purchasing power of the average wage also occurred in terms of other food articles: pork roast (29 kg), boneless veal shoulder (20 kg), regular sausage (8.5 kg), boiled pork ham (11 kg) and Baltic herring (3 kg).

However, when the purchasing power of the minimum wage is compared for the same articles, it proves to be lower only with respect to port roast and veal (4 kg) and boiled pork ham (2.2 kg). On the other hand, the minimum wage buys more bread (57 loaves), more regular sausage (3 kg) and more Baltic herring (19 kg).

The purchasing power of the average wage and the minimum wage in 1982 is at the same time higher than that of comparable wages from a decade ago with regard to various other food products. For example, in comparison with the figures for 1972, more Wroclaw-style wheat flour can be bought now--26 kg in the case of the average wage and 64 kg in the case of the minimum wage, more rice, 16 kg and 50 kg, respectively; degutted chicken, 24.5 kg and 10 kg; plant-origin butter, 12.5 kg and 40 kg; cream butter, 3 kg and 6 kg; and 2 percent-fat milk, 58 liters and 146 liters. Of course, it should be noted here that some of the products listed in this article could be bought in such quantities were it not for rationing. This, however, is a separate subject...

In general, these calculations indicate that in comparison with the situation a decade ago food has become relatively more costly: primarily affected is meat and meat products, with the drop in purchasing power occurring to a very limited extent so far as the minimum wage is concerned. For a majority of other food products, the purchasing power of the average and the minimum wage is currently higher than it was in 1972.

Increases in the prices of manufactured articles, occasionally shocking the purchaser with their magnitude, were nearly concurrent with the reform of food prices. Let us examine the value of purchasing power with regard to this commodity group, taking the most popular articles as an example. For a man's two-piece 100 percent polyester worsted suit (costing 1,620 zlotys in 1972 and 3,850 zlotys now), the purchasing power of the average and the minimum wage increased respectively, by 0.85 and 0.67 of a suit, for a men's wool polyester shirt (comparable prices 220 and 550 zlotys), the increase is 5 and 4.4 shirts, for women's leather shoes with manmade soles (250 zlotys and 825 zlotys) the increase is 1 pair and 1.95 pairs, IXI-65 laundry detergent (0.40 kg) the increase is 142 and 98 boxes, for Seven Blossoms bath soap (100 grams) the increase is 370 and 301 bars and for Nivea toothpaste (65 grams) the increase is 86 and 141 tubes.

The purchasing power of wages has risen over the 1972 levels also for such durable goods as the Alfa vacuum cleaner (priced at 1,150 zlotys 10 years ago and 2,500 zlotys now). The increase is 1.5 vacuum cleaners for the average wage and 1.1 for the minimum wage. The figures are, respectively, 0.31 and 0.22 for a 180-liter-capacity compressor-type refrigerator (priced at 7,000 and 13,000 zlotys), 1 and 0.16 for a C-28 thermostat pressing iron (priced at 185 zlotys and 650 zlotys), 0.21 and 0.16 for a 20-inch television set (priced at 7,400 zlotys and 16,700 zlotys) and 0.21 for an FA-5 rotary washing machine (priced at 10,500 and 20,000 zlotys) in the case of the minimum wage (the purchasing power of the average wage remained unchanged).

Certain construction materials have become relatively more expansive in the decade under comparison. An average wage can now buy 640 fewer bricks and 1.64 tons less Portland "250" cement (though this comparison is perhaps of little practical value since hardly anyone can afford to build a house using his average wage alone, without credit assistance or relatives' help).

In spite of the substantial increases in fuel and energy prices, the period in question has brought about increased purchasing power in the case of grade 1 hard coal by 50 kg in the average wage and by 65 kg in the minimum wage, electricity by 2,340 kWh and 1,616 kWh, respectively, high-methane natural gas by 630 cubic meters and 707 cubic meters. On the other hand, the purchasing power decreased in reference to motor gasoline.

The purchasing power of wages varies with regard to alcohol and tobacco. Following substantial price increases, the average wage currently buys 17.65 fewer bottles of vodka (0.5 liter each, priced at 330 zlotys) and the minimum wage 3.3 fewer than 10 years ago. On the other hand, 122 more packs of Sport cigarettes can be bought for the average wage and 161 more packs can be bought for the minimum wage.

A general conclusion to be drawn from the PKC-prepared data is that, despite major price shifts in the recent period, the purchasing power of the average and minimum wage is greater now than in 1972 with regard to most basic consumer goods.

Stating the fact that the purchasing power of wages has increased based on the above calculations may clash with the sentiment of a large segment of society. This is justified because everyone will primarily compare his purchasing power only over the last few years. In those years, however, as a society, we consumed much more than we were producing, and the economy was still in its forward "gear," though the signs of crisis were becoming increasingly evident. Consequently, the real value of our wages was correspondingly higher. Today, with the country's per capita production and national income reduced nearly to the 1972 levels, we must also go back 10 years to compare our ability to meet our needs. This comparison provides a more objective assessment of the results of the crisis we all feel, along with an evaluation of our standard of living.

8795
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ROMANIA

NEED FOR EFFICIENT USE OF ENERGY RESOURCES STRESSED

Bucharest ERA SOCIALISTA in Romanian No 7, 5 Apr 82 pp 7-9

[Article by engineer Dr Nicolae Armencoiu, director of the Institute for Energy Studies and Designs: "Energy Resources Broadly and Efficiently Used"]

[Text] It is a generally known and recognized fact that the activities of any society is, today, more than ever dependent upon its energy base and electrical energy industry.

Beginning with the important role played by energy, in its diverse forms, in the overall group of factors of social-economic progress, the Romanian Communist Party and its secretary general, comrade Nicolae Ceausescu, are giving great attention to the development of the country's energy base and the rational, efficient use of energy resources. Under current conditions, in which Romania is importing fuels and the prices for these fuels on the international market have had an unprecedented increase (see Table No 1), with there being an upward trend in some cases, the use of all ways and means to have the careful management of each gram of fuel represents a task of great responsibility and a patriotic duty for all the country's workers and especially for the specialists in all the fields of activity.

As is also natural, the better use of energy resources at a high level of efficiency constitutes and must constitute more and more a priority concern for all the workers in the energy field in the country. This task stems clearly from the documents of the 12th RCP Congress, which considered it as one of the basic conditions for achieving our country's energy independence. In this regard, at the joint plenary session of the RCP Central Committee and the Supreme Council of Economic and Social Development in November 1981, comrade Nicolae Ceausescu pointed out: "It is necessary for us to place in the center of the 1982 plan the achievement of the established petroleum and coal production and the development of new energy sources, as well as the reduction of the consumption levels for fuels and energy and the proper administration of our energy sources."

The evaluation of how energy resources are used can be accomplished in a number of ways. There is, for example, a close dependency between the evolution of macroeconomic indicators and the evolution of energy consumption. As shown by statistical data, this evolution was generally favorable in our country (see Table No 2).

Table No 1

The Evolution of the Price for Fuels on the World Market During the Period 1970 to 1980

(in dollars per ton of conventional fuel)

Type of Fuel	1970	1975	1980
Coal	19	63	68
Petroleum	10	61	168
Gas	12	30	124

Source: United Nations, Economic and Social Council, October 1981

Table No 2

The Evolution of Certain Macroeconomic and Energy Indicators in Romania

(average annual rates - in percent)

	1961-1970	1971-1980
National Income	8.3	9.3
Total Industrial Production	12.8	11.4
Primary Energy Consumption	7.8	4.8
Electrical Energy Consumption	15.7	7.5

The analysis of the data shows that for the approximately constant values of the indicators of the country's economic development over the last 2 decades there has been a noticeable reduction in energy consumption. Thus, the average annual rate of growth in primary energy consumption fell from 7.8 percent in the 1961-1970 decade to 4.8 percent in the following decade, while the figure for the growth in electrical energy consumption fell from 15.7 to 7.5 percent. These reductions in energy consumption are the result of certain broad and sustained actions for the rational use of energy in all its diverse forms. As a result of these actions, which were strongly intensified in recent years, during the period 1978-1980 there was an even lower average annual rate, of 1.7 percent in the consumption of primary energy and 2.6 percent for electrical energy.

At the same time, the data show that in these 2 decades the average annual rates of growth in the consumption of electrical energy were greater than those for primary energy. This phenomenon, which exists in practically all countries, is due to the preference for extending electrically-operated systems, a preference justified by the advantages that electrical energy has over other forms of energy. It must also be added that the reduction in the consumption of hydrocarbons, as a general trend, is compensated only partly by the use of coals, with another portion being taken over by electrical energy. This aspect is determined by the fact that a series of qualities that stem from the properties of hydrocarbons can be further provided in a satisfactory manner only by electrical energy.

In our country, energy consumption from an absolute point of view has continued to increase, reaching a point in 1980 of being more than three times greater than 2 decades ago. At the same time, electrical energy consumption, taken separately, has increased by approximately nine times. Concomitantly, we are seeing a decline in the consumption of energy and electrical energy per unit of national income, an especially expressive indicator regarding the efficiency of using energy resources. Thus, energy consumption fell from 276 kgcc/1,000 lei of national income in 1970 to 180 kgcc/1,000 lei in 1980, while the consumption of electrical energy fell from 154 kwh/1,000 lei to approximately 130 kwh/1,000 lei. What we must quickly state is that in Romania the energy consumption levels for a unit of national income are two to three times greater than in other countries, a fact that mirrors synthetically, bu very convincingly the great efforts that must be made in order to reduce these consumption levels to the possible and acceptable limits.

As can be seen from these data, the Romanian energy situation has taken great steps forward, contributing to the successful achievement of the country's economic and social development plans. Nonetheless, from the point of view of managing energy resources with maximum efficiency and rationally using energy in whatever form, there is much, even very much to do. This statement can be illustrated by a single fact. Energy efficiency in industry is located between 45 and 47 percent, which is a sufficiently low level.

Since industry holds over 80 percent of the total energy consumption, it is understood that it is the main field in which work must be done to conserve energy of all types, without neglecting, certainly, other fields. Increasing energy efficiency in our industry by only one to two percent, an extremely modest increase and one capable of being achieved sufficiently quickly, would result in an appreciable energy savings, on the order of .8 to 1.6 million tons of conventional fuel. In establishing the means of increasing energy efficiency, we must keep in mind, first of all, the fact that millions of tons of conventional fuel are lost by not using secondary energy resources and that very many products are produced with a high level of specific fuel consumption.

Actually, reality points out that large amounts of fluids leave installations containing a high level of heat and the energy efficiency of diverse technological installations is at a totally unsatisfactory level. Thus, at forging furnaces the temperature of the vented gases reach 1,10001,200 degrees centigrade and the energy efficiency is merely 19-20 percent. For furnaces for melting down metals, the respective figures are 850 to 1,200 degrees and 35 to 38 percent; for rotating furnaces in the production of cement (wet process), the figures are 900 to 1,100 degrees and 48-50 percent; for vat furnaces for the production of glass, they are 900 to 1,300 degrees and 8 to 12 percent; and for tunnel furnaces used in the production of ceramic materials, the figures are 250 to 400 degrees and 45 to 48 percent.

Certainly, the efficiency of an installation depends both upon its level of development, the parameters at which it is operating and the level of physical and moral wear and tear, and upon the types of energy used. For example, a thermal-electric power station like Doicesti, a station built 25 years ago and equipped with 20 mw groups of equipment, as a level of fuel consumption of 485 gcc/kwh, while the new 200 mw groups that are being installed in this power station attain a level of fuel consumption of 390 gcc/kwh. Along these lines, we can point out that in a modern and integrated industrial unit overall energy efficiency can reach 50 to 55 percent and even more, while in a unit where the installations are older and show wear and tear the efficiency level falls greatly. It can be concluded, therefore, that in order to increase efficiency it is necessary to modernize all installations, to ensure their proper operation and to use the most advantageous type of energy. We will return to this question later.

Currently, there is no country that is not facing the problem of more carefully using energy in whatever form. As a result of the events that unleashed the 1973 oil crisis, the majority of governments has adopted policies to rationalize energy use, calling for the reduction of energy consumption, as well as the replacement of oil with other forms of energy. As a result of these measures, in the countries encompassed by the United Nations Economic Commission for Europe, which also includes the countries in Europe and the United States and Canada, during the period 1973-1978 the average annual rates of energy development slowed (1.7 percent for primary energy and 3 percent for electrical energy) in comparison to the previous 1965-1973 period (4.8 percent for primary energy and 7 percent for electrical energy). We can note a higher rate of growth for electrical energy consumption than for primary energy, an evolution also recorded in our country, as was pointed out earlier.

An analysis of the average annual rates of growth in the consumption of primary energy in different countries during the 1965-1978 period shows that in the majority of countries there was a noticeable reduction in these rates during the period 1973-1978, with some countries even attaining negative growth rates, that is, reductions in the total consumption of primary energy (Belgium, Switzerland and England). More than that, as a result of reducing energy development rates, lower rates of economic growth were also recorded, which once again illustrates the correlation between energy consumption and economic activities within the framework of a given society. Despite this, by introducing certain measures to increase the efficiency of energy resource use in a series of high consumption branches, a number of countries succeeded in holding the reduction in economic growth rates to a much smaller extent than the decreases in the rate of energy development.

Paralleling the reduction in the specific energy consumption levels, there also was a reduction in the consumption of petroleum. Generally, the countries in which there was a reduction in specific consumption obtained these reductions primarily by decreasing petroleum consumption. At the same time, very many countries recorded significant reductions in the specific consumption of energy per unit of national product, between 14 and 28 percent, levels much higher than those achieved by Romania during the same period (9 percent). In these data, we have strong arguments regarding the opportunities and necessity for working on a broad front for the purpose of managing our energy resources with maximum care and efficiency. In other words, there is still much to do until we fulfill the basic objective formulated in the party documents regarding ensuring our country's energy independence by the end of this decade.

Recently, we have begun to implement solutions for the recovery of secondary energy resources, such as, for example: the installation of certain heat exchangers to recover heat from the vent gases from the forging process, from thermal treatment furnaces and so forth. Similarly, actions have been begun to use secondary thermal resources having a lower thermal potential by using heat pumps. These actions, these attempts and trys nonetheless only partially resolve the problems.

Given the situation of the low efficiency in the majority of the installations in all fields, its is necessary, first of all, to know the sources of losses and the points in the technological processes where losses appear, where, therefore, we must intervene. These findings can be accomplished by drawing up energy reviews, actions that have been started, but, unfortunately, in many places not finished. Energy reviews have been drawn up in numerous sectors of activity, factories and small or large installations, but everything has been reduced to an accounting review that has recorded and noted where the losses are occurring. Sometimes there has also been a statement of how to remedy the situation, but there has been no organized and firm implementation of the remedies. The conclusion is self-evident. It is a duty of top priority for the enterprises and centrals to finalize the energy reviews and thus obtain a higher efficiency in the use of technical equipment. Similarly, we feel that the energy reviews should be complemented with complex energy and economic analyses, at the level of the entire country, in order to determine the overall efficiency of the solutions proposed following the analysis of the energy reviews.

It is well-known that in general the conservation of a gram of fuel or a kilowatt-hour is accomplished with investments much smaller in comparison to obtaining it from domestic resources or, even worse, from importing an equivalent amount. This fact must, however, be proven from case to case on the basis of certain technical-economic analyses. In a series of cases, conservation solutions require additional investments and the total energy consumption does not infrequently cancel out the anticipated final energy savings. For that reason, we feel it is necessary for the solutions that are established for the conservation of energy to be analyzed also taking into account the total amount of energy contained in the installations or in other resources that are to serve in achieving the expected savings.

One sector having great reserves for the conservation of energy is the electrical power stations and networks. In this sector, recently, greater attention has been given to reducing specific consumption and recovering secondary energy resources by carrying out thorough analyses and outlining, on the basis of reviews, those points of reduced energy efficiency. At the same time, in this sector they have also kept in mind the total amount of energy involved in the solutions proposed to increase efficiency. They remain only to be applied with consistency.

The management of all available energy resources with maximum efficiency and the balancing of energy in-puts and out-flows require broad actions that are the major concerns of the workers in the energy field - from the intensification of the priority use of inferior fuels in the production of electrical energy and heat in the thermal power systems to the better use of the hydro-energy potential, going as far as managing those interior rivers having small vertical drops and using micro-hyro-power stations; from the development of nuclear energy to the better use of new sources (solar, wind, geo-thermal, wastes, biomass and so forth) for the production of heat and electrical energy up to the use of new technologies to obtain hydrocarbons from coal or bituminous shale by means of gasification and liquification, and so forth.

According to the guidelines established by the 12th RCP Congress, the designers in the Ministry of Electrical Energy are working perseveringly to promote power stations using coal and bituminous shale, to achieve the nuclear-electric power station program, to develop thermal power and so forth. Thus, in recent years large power stations have appeared that use lignite at Rovinari and Turceni, equipped with 330 mw groups of equipment and boilers of 1,035 tons of steam per hour that are of Romanian manufacture, power stations that have contributed to increasing the level of thermal-electric power produced on coal. If in 1965, for example, the percentage of electrical energy produced on coal in the total amount of thermal-electric energy was 19.6 percent, in 1980 it had increased to 32.6 percent.

For the purpose of increasing the operating efficiency of the large thermal-electric power stations using coal, actions are taking place that should be intensified and broadened for the purpose of improving coal supplies, upgrading energy equipment and their operating schemes, reducing the addition of hydrocarbons to those furnaces that use lignite and so forth. In this regard, we also have the shutdown of certain thermal-electica power stations operating on hydrocarbons as well as the transformation of others so they can operate on coal.

There is also special interest in the expansion of the heat-producing processes as an important means of saving fuel. The amount of heat produced in the heat production process has increased over the last 2 decades from 8.5 million Gcal in 1960 to approximately 83 million Gcal in 1980, or an increase by approximately 10 times over. The production of heat in the heat production process has led to a fuel savings, in 1980 alone, of approximately three million tons of conventional fuel. The combined production of electrical and thermal energy in the heat production stations has been, at the same time, one of the factors that contributed to the decrease in the specific fuel consumption in the production of electrical energy. Thus, between 1960 and 1980 this consumption fell from 502 gcc/kwh to 325 gcc/kwh.

Decreasing the technological consumption of electrical energy in the electrical transport and distribution networks to levels comparable to those in advanced countries is a chapter of specific concerns. The studies that have been conducted have pointed out that it is possible to reduce energy losses in the transmission network by optimizing the operating conditions, by increasing the efficiency of installations and equipment and by building new investment projects to optimize the structures in the network. As a result of applying such measures promising results have been obtained. The levels achieved in technological consumption proper in the electrical networks, approximately 5.7 percent of the total amount of electrical energy produced in 1980, are better than the levels attained in the systems of a number of developed countries such as England and Sweden, as well as in neighboring socialist countries. In order to continue to reduce this technological consumption, we foresee, on one hand, the construction of certain new energy installations and, on the other hand, the supply of equipment and utilities having improved efficiency levels (transformers, polyethylene-insulated cables, hexafluoride-protected installations), the installation of processing computers in stations, power stations and centralized operations command posts, and so forth.

The case studies conducted on the electrical networks at 19 large enterprises of different types from the point of view of the structure and levels of electrical energy consumption, as well as the networks themselves, have demonstrated that there are opportunities for the successful application of certain common measures to conserve energy. Thus, just the measures related to optimizing the operating conditions of the networks, as they are today, would lead to savings of approximately 9.6 million kwh per year. By making certain additional investments of approximately 18.7 million lei, an amount recoverable in 6 years at the current price of fuels, savings of an additional 3.5 million kwh per year could be obtained.

The problem of the rational, efficient use of the country's energy resources cannot constitute a campaign-type activity, much less a limited action in a certain sector of economic-social affairs. By pursuing perseveringly and in each and every area the establishment and implementation of certain high energy effficiency solutions, we will be able to honestly carry out our tasks of ensuring our country's energy independence.

8724
CSO: 2700

RECOMMENDATIONS FOR IMPROVING TRAINING OF AGRICULTURAL ECONOMISTS

Bucharest ERA SOCIALISTA in Romanian No 7, 5 Apr 82 pp 20-21

[Article by Gheorghe Fierbinteanu, deputy minister of agriculture and the food industry: "Training the Economist for Agriculture"]

[Text] The leadership of the Ministry of Agriculture and the Food Industry is following with great interest, since it is directly involved, the discussion that is being presented in the pages of ERA SOCIALISTA regarding the means of training economists for agriculture. It is clear that one of the fundamental requirements of the new agricultural revolution in Romania (in addition to the significant increase of agricultural production) is the growth of economic efficiency in order to be able to consistently apply the principles of self-management and self-administration at the level of every agricultural unit.

In this context, as an agricultural economist and coordinator for plan and economic problems in the leadership of the Ministry of Agriculture and the Food Industry, which benefits from an overwhelming proportion of graduates having higher economic training for agriculture, I will try to present several subjects that I feel are necessary in the process of training these specialists, whose importance increases very much under conditions where agriculture has become a priority branch in economic development and the fulfillment of the territorial Self-Supply Program raises management problems that are totally different from the ones to date.

First of all, I would like to refer to the quantitative facet of the problem, that is, to the number of specialists that are necessary. I will not present figures since the ones that have been published are clear and reflect the lack of concern generally, to date, for the economic problems of agriculture. For that reason, the first solution that is needed is to considerably increase the numbers of people being schooled in higher economic education for agriculture. In this regard, we propose that, in a short period of time, we will make a study available to the Ministry of Education and Training and the State Planning Committee regarding the necessary number of economists having higher studies for agriculture, staggering the figures for training over the years so that, at the latest, by 1990 all positions (which require specialists with this type of training) will be filled. A second solution refers to keeping the assigned specialists in agriculture, since it has been found that there is a powerful migratory current towards other branches of the national economy which, at his point in time, offer them better living conditions. This phenomenon is noted not only for the graduates of regular daytime courses, but also for those who take correspondence courses. Although they are required to work in agriculture for the entire period of their studies, at the end of these studies many of them "withdraw" to "more comfortable" positions. Certainly, we cannot lose track of the fact that this migration of young graduates is also "favored" by totally subjective factors, such as the mistrust and even hostility with which they are greeted by the old personnel at the places of work who do not have corresponding educations, who see in these new people direct competition, who then "facilitate" their departure and so forth. But, we feel that it is time to take appropriate measures in this regard. I thing that the most accessible measure (and, at the same time, necessary) is the training of these specialists within the framework of the agronomic institutes, a situation where they would be similar to the graduates of these institutes and, by subjecting them to current regulations, any transfer would be made only within the framework of agriculture with the approval of higher authorities. A simple comparison of situations is absolutely graphic: after 10 years since their graduation from the departments in the Academy of Economic Studies. only 26 percent of the 1967 graduating class were still working in agriculture, while of the graduating class of 1971 from the Bucharest Agronomic Institute, 86 percent are working directly in agriculture, with the rest working in institutes that serve agriculture.

For that reason, we propose that, together with the Ministry of Education and Training, beginning in 1982/1983 we organize the transfer of the current departments and sections for agricultural accounting and economics to the agronomic institutes, keeping in mind not only their dual subordination, but also the fact that our ministry is the principal user of these graduates and for whom training has new requirements.

With this point, I now come to the second facet of the problem - the qualitative facet, the professional training of the graduates. This is even more important since from the production sector we are hearing news about the weaker professional training of the graduates in recent years, especially in conceptual areas, but also in connection with production.

In this direction, tough words are spoken by the profile of the specialists themselves. And, our socialist agriculture has entered a stage of economic development, under the imperative requirements of self-management and self-administration, in which it is absolutely necessary to have a specialist in economic management whose theoretical and practical training will allow him to make the most appropriate decisions, bringing together and using the knowledge of other specialists who are responsible for each field or specialty: agronomy, zootechny, veterinary medicine, agricultural mechanization, accounting, technical-material supply, use of agricultural products and so forth.

I feel it is our duty to implement the directives issued by the secretary general of the party, comrade Nicolae Ceausescu, which, in the sharp criticism he addressed to us in his speech at the plenary session of the National Council on Agriculture, the Food Industry, Sylviculture and the Management of Waters, stated: "We must stop trying to transform engineers into specialists in the production of paper instead of being specialists in grain crops... The agronomist must be concerned about wheat crops, corn, grains, technical crops and others... This is what he studied for and this is what he must do. We must take paper out of the hands of the zootechnical specialists and the veterinary doctors; they must take care of livestock and their health... all specialized personnel must be involved in production..."

Along this line, it is clear that the current profile (!) of "agricultural accounting and economics" does not correspond to the new requirements for the management of agriculture as formulated by comrade Nicolae Ceausescu. For that reason, we fully share the new concept presented in ERA SOCIALISTA regarding the training of a "production economist" whose profile, by harmoniously combining (basic) economic knowledge with (complementary) specialized technological knowledge, will provide competent agricultural management in all its component steps (from the farm to the ministry). Let us take a single example. Currently, the head of a crop farm (for example) is automatically an agronomic engineer who is required to be concerned about all the aspects of management, even those which he did not study at school. The economic specialist having higher studies is reduced to the simple position of accountant (an activity for which higher studies are not even necessary). We feel that things should be changed: the agronomist should be concerned about production and the correct application of technologies, with the tasks of management, and all its implications, going to the production economist. Certainly, this requires a new way of thinking about the tasks and attributes in agriculture and even requires the changing of certain outdated titles, but we must do everything to stay on top of the new requirements.

It is clear that for the type of profile that we are talking about the training of the economist for production can take place only within the agronomic institutes according to an adequate instructional plan that will ensure an integrated training, on the basis of which the specialist will be immediately able to adapt production activities.

But, the sphere of training for agricultural economists is much broader. We also need a modern accountant-economist who will ensure the implementation of modern informational systems at the level of each agricultural unit. He could be very well trained within the framework of the current specialty of accounting and finance, as well as for the other branches of the national economy.

We have great need for specialists in the sale of agricultural products who will promote the new marketing models. They could be trained within the framework of the current specialty of "domestic trade" which, unfortunately, limits the sphere of trade and ignores the interests of agriculture. We also need a planner-economist who knows to an equal degree the methods of modern planning and the economic processes in agriculture.

Unfortunately, the training plans for the majority of specialties listed above do not reflect to an efficient degree the interests of training for agriculture. One can see that under current conditions agriculture plays a decisive role in the country's economic development and that the trade of agricultural products cannot be done if the sale itself of agricultural products is not organized appropriately. For that reason, we feel it is necessary for us, together with the Ministry of Education and Training, to participate in the improvement of training plans for these specialties so that they can also respond to the needs of agriculture. Similarly, we are for a closer cooperation with the leadership organs of the institutes of higher economic education in order to give us the opportunity to effectively participate in the implementation of the above-mentioned measures. In any case, is it possible for us to grant the necessary assistance if, for example, the Ministry of Agriculture and the Food Industry does not have a representative in the senate of the Academy of Economic Studies?

By providing all the interested institutes with our effective assistance for a better training of economists having higher studies for agriculture, we are ready to do everything in order to respond to the directives in this field issued by the secretary general of the party, comrade Nicolae Ceausescu.

8724
CSO: 2700

SLOVENIA ACCUSED OF HOLDING BACK HARD CURRENCY EARNINGS

Belgrade PRIVREDNI PREGLED in Serbo-Croatian 9 Apr 82 p 5

[Text] In a desire to obtain higher rates of interest and differences in rates of exchange certain organizations of associated labor which are exporters are exceeding the periods allowed for repatriating foreign exchange proceeds for goods which have been sold, though loans on rather favorable terms financed with primary note issue are being used to cover exports. The reproach addressed by the Slovenian delegate (in the last session of the Chamber of Republics and Provinces of the Yugoslav Assembly) to the Federal Executive Council and the response of a vice chairman of the Federal Executive Council.

The basic aim of the measures which are to be adopted is to stimulate organizations of associated labor on an economic basis to include foreign exchange realized through exports in the flows of a unified foreign exchange market, said Milena Rakcevic, Slovenian delegate in the SFRY Assembly, in the last session of the Chamber of Republics and Provinces, during the debate on economic trends at the beginning of the year. However, she continued, it seems to me that the draft of these measures does not conform to the joint commitments. [Use of quotes follows original--translator's note] The measures being offered are administrative and are not stimulative.

A balance must be drawn up of the inflow and outflow of foreign exchange not only for the country as a whole, but also for the republics and provinces, and only then solutions sought to improve the economy's liquidity. So far this kind of balance has not been drawn up, so that one cannot authentically examine the real situation in the republics and provinces. Slovenia, for example, accounts for 26 percent of all the country's exports, the total obligations of organizations of associated labor for this year amounted to $733 million.

The Law Is Weaker Than an Agreement

If exports and imports were to conform to the payments-balance position and should all obligations be met to the social community, this republic would not have a surplus, but a deficit. If the targets for exports and the inflow of foreign exchange were not met, there would be a shortage of about $470 million. People are saying, that is, that OUR's [organization of associated labor] in Slovenia have enough foreign exchange. But the truth is that the problem of foreign exchange liquidity is the main limit on our development.

Also, the situation with the supply of petroleum confirms in all the republics and provinces that not much can be done with excessive administration to improve the situation. As a temporary measure to furnish the foreign exchange to import petroleum, the law has been functioning less well than last year's self-management accord. Now a majority of the republics and provinces are not discharging their legal obligations. There is good reason, then, to put a question to the Federal Executive Council [SIV] as to why the penalties envisaged by that law are being avoided. And something else: Toward the end of 1981 the Federal Executive Council issued an order temporarily restricting imports of goods paid for in convertible currencies, and it was in effect until 31 March this year.

If the occurrence of disturbances in foreign trade were expected in the first quarter, SIV had a duty and responsibility to propose measures that would anticipate those disturbances in the planning documents for this year. The agreed economic policy and measures cannot simply be "called out of bounds" and the SFRY Assembly informed accordingly. To put it mildly, this violates the spirit and letter of our system. Such actions instill uncertainty in the conditions for the conduct of economic activity and make it impossible for real plans to be made in OUR's and self-managing communities of interest for foreign economic relations. All the measures to correct the economic situation during this year, then, should be conceived on a self-management basis, and that means that associated labor should be involved in their enactment, rather than having this done by the government in its place. It is indispensable that SIV, along with the May analysis, propose versions of a way out of the present economic difficulties, Milena Rakcevic said.

Driven From Pillar to Post

These observations by the delegate did not, of course, go unnoticed. In responding to these questions Gojko Ubiparip, vice chairman of SIV, emphasized that toward the end of last year the Federal Executive Council did not restrict imports in any way whatsoever, but only brought imports into line with exports. That is, anyone who exports sufficiently can also import without restriction. However, the unfavorable liquidity of the economy is especially disturbing. One often sees displayed in our context the attitude that one should buy everything he can and send the bill for repayment of credit and petroleum to someone else. Unfortunately, the legislation in this respect has not been honored. We will compile an analysis of this, we will have accurate records on the size of the inflow of foreign exchange in the republics and provinces, the manner in which and extent to which obligations have been discharged, the principal and interest repaid on credit, the amount given for imports, and how much for other purposes.

The measures of SIV, then, are not restrictive in nature, but are aimed at effectively putting flows in international payments in order. Is the repatriation of foreign exchange based on economic measures, are organizations of associated labor stimulated to do this? This question has been raised by the lady comrade who is a Slovenian delegate. I must say that according to the data of the Social Accounting Service the accounts receivable of the Slovenian economy for goods sold exceeding 90 days amount to $440 million. There are, then, long extensions of the periods for repatriation of foreign exchange, and we are going from pillar to post seeking loans to furnish credit to finance the most necessary needs.

Croatia also has $270 million not repatriated for about 90 days. Finally, if goods are sold on payment terms exceeding 3 months, then this is a credit relation and should be treated as such, instead of extending the periods for repatriation of the foreign exchange and in addition using the rather favorable terms on credit financing of exports financed from primary note issue. Consequently, no one can be given an incentive to fail to repatriate foreign exchange through rediscounted credits and rediscount policy, waiting for good rates of interest and high differences in rates of exchange resulting from the accelerated "slide" of the rate of exchange of the dinar.

SIV is being reproached, the vice chairman of SIV said in his response, because we have not been penalizing the failure to honor the law on petroleum. On the contrary, we will be undertaking even criminal measures against those who do not pay up the funds for petroleum, but hold back foreign exchange for other purposes. It is true that these measures have not been taken on time, but SIV will soon be taking them.

7045
CSO: 2800/366

TESTING FOR GEOTHERMAL ENERGY SOURCES IN CROATIA

Zagreb NAFTA in Serbo-Croatian No 5, May 81 pp 233-235

[Article* by Davorin Babic, petroleum engineer; Radovan Filjak, engineering geologist; and Stjepan Galovic, mining engineer; specialist-organizer, team leader and adviser, respectively, in the Development Department of INA-Naftaplin: "Development of Exploration for Geothermal Energy"]

[Text] Intensive work has continued since the time when Naftaplin specialists delivered the first report before this body in JAZU on the problems related to commencement of organized investigation, evaluation and use of geothermal sources of energy in SR [Socialist Republic] Croatia. A particular impetus was received after the work organization INA-Naftaplin was assigned the task of investigating the republic's potential geothermal resources and developing them in the republic medium-term plan for development of the fuel and power industry.

To that end personnel of INA-Naftaplin have done a geothermal regionalization of the territory of the republic on the basis of the values of temperature gradients measured in oil and gas wells. Three characteristic regions were distinguished in this way:

i. the Pannonian sedimentary basin with geothermal gradients 40°-55° C per kilometer,

ii. the Dinarids with a gradient of 10°-15° C per kilometer, and

iii. the Adriatic seabed with a gradient of 20°-25° C per kilometer.

Other areas in the Croatian Zagorje with numerous well-known occurrences of thermal waters and the areas of ophiolitic rock in Kordun and Banija were not defined. Both these areas represent outlying border zones of the Pannonian Basin, and, since deep exploratory drilling has not been done there to any considerable extent, the geothermal relations are for the present unknown.

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* Delivered as a paper on 24 April 1980 at the 11th Regular Plenum of the Scientific Council for Petroleum of JAZU [Yugoslav Academy of Sciences and Arts].

The areas of the Dinarids and Adriatic seabed, then, have little promise from the geothermal standpoint and in this phase will not be the subject of further investigations, but rather the work will be concentrated in the area of the Pannonian sedimentary basin.

With respect to the level of the temperature gradients and pressure in the aquifers the basin has the characteristics of a semithermal region, i.e., of a geothermal region in which water can be expected with temperatures exceeding even 200° C, but without geothermal fields in which steam might be produced.

Thanks to the relatively high level of exploration of the Pannonian Basin and the uniformly favorable density of oil wells, it has been possible to compile a regionalization and to assess the promise of various areas even without specific exploratory work. This greatly reduced the costs in the cycle of discovering, developing and using geothermal energy.

The possibility of applying geothermal energy is also one of the factors influencing the direction given to exploratory work. In general the more highly developed urban areas, industry and advanced agriculture are potential users of geothermal energy, and those are precisely the categories offered by the Pannonian Basin.

In the present phase of development of the geothermal potential, exploratory work has been concentrated on testing for flow and other hydrodynamic parameters of wells and aquifers. At present these are still abandoned oil wells, and the choice was affected by the vicinity of potential users either for agricultural and industrial purposes or for recreation or heating.

Guided by these considerations, it is natural that the broad area around Zagreb should have been the focus of the plan of investigations, which consisted of testing Miocene-Mesozoic aquifers with water temperatures of 57°-80° C and low mineralization. The principal outlines of the aquifers can be approximately determined, as we have already said, from exploratory oil and gas wells, and the work which is under way is supposed to verify the southeastern boundaries of the aquifers and thereby confirm the reserves of fluids and, most important, offer data on the flow of production wells.

In the Drava Valley between Ludberg, Koprivnica and Djurdjevac an extensive carbonate thermal aquifer runs at a mean depth of about 2,000 meters, with water temperatures of 100°-120° C and a flow exceeding 100 cubic meters per hour. In its caloric potential, then, this area is more important than the Zagreb area, and another favorable circumstance is that there is a very highly developed agricultural production and accompanying food processing industry here, which would be important possible consumers of this type of energy.

In the region of Slavonia investigations have concentrated on aquifers of Miocene age with good temperature characteristics; however, they have high mineralization and variable reservoir characteristics. Of particular interest are the very extensive sandstones of the Pliocene stratum of the so-called Osijek sandstones, which run even to a thickness of 300 meters and have favorable reservoir characteristics and temperatures exceeding 70° C.

Testing of "Pannonian" aquifers is also under way at the localities Zelina, Sisak and Virovitica, and testing of Miocene aquifers is under way in the Medjimurje area.

It is evident from this short survey that under the present plan investigations are being conducted at practically all potential aquifers over the entire area of the Pannonian Basin.

In the brief survey that follows we will present the results of investigation and measurements at several localities from which one can obtain a more concrete picture of the aquifers that exist.

Bizovac

Use of geothermal energy from this occurrence in eastern Slavonia was undertaken for certain objective reasons without prior detailed testing. The testing was undertaken only after 3.6 x 10^5 cubic meters of water were produced to meet the needs of the spas there, and the stratum pressure dropped 28.3 bars. The Reservoir Limit Test established reserves of only 1.24 x 10^8 cubic meters of water, and also showed that this was a closed type of occurrence. It was also evident from these measurements that if extraction continues, spontaneous eruption will soon cease because of further drop of the stratum pressure. Immediately after the tests were made, then, work was undertaken to find a solution. Another negative exploratory well 850 meters from the first one was activated on the assumption that it had punctured the hydrodynamic structure from which the water was produced. Water began to be injected into this well in order to maintain stratum pressure. The Pulse Test was conducted between the production well and the injection well in order to determine whether it really was a case of the same hydrodynamic structure. Although the Pulse Test is not an unknown method, especially in defining structural relations in oil and gas deposits, it is worth mentioning that it was conducted in an unusual way in this specific case. The specific feature of this measurement lay in the fact that the well on which the observations were made was in production during the entire measurement, and yet an almost classic example of the Pulse Test was obtained. On the basis of that and also certain other tests, it was ascertained that the production well and the injection well penetrate the same hydrodynamic structure, that low stratum pressure is the only reason for the small yield of the production well, and that the equipment installed in the injection well should be repaired in order to make the process more economical.

Lunjkovec

The well Lun-1, not far from Koprivnica, punctured a number of water-bearing strata. The very first tests indicated our most promising source of thermal water to date. For that reason a number of measurements were taken so as to obtain as many parameters as possible of the stratum, stratum fluids, and their mutual relations. The RLT [Reservoir Limit Test] established a volume of 3.20 x 10^7 cubic meters. Though our intention was to establish the type and form of the source, this was not possible on the basis of the measurements taken. The measurement lasted 1,180 hours, but it was estimated that determination of these parameters would have required extending it for at least twice as long, which we did not consider necessary, especially since the time necessary could have increased many times over because of the irregular form of the source. The next parameter we wanted to ascertain was the maximum yield of the well. In spite of a number of problems related to the formation of scale, it was established that the well with a pressure of 15 bars at the mouth produces 2,016 cubic meters of water a day, that is, that IP [productivity index] = 134.4 cubic meters per day per bar.

For that amount the temperature of the water at the mouth was 116° C. It was also established that the well would yield this amount for a maximum of 6-7 years, and that assuming that the scale problem did not exist. Yet if the formation of scale were prevented by conducting the process under certain pressure and temperature conditions under which scale does not form, this production of thermal water would last a considerably shorter period of time.

The next thing we wished to determine with the tests was the P-T [pressure-temperature] conditions under which formation of scale begins.

To that end measurements were taken in the well, and laboratory tests were run.

On the basis of the results obtained the minimum pressures and temperatures were determined at which scale is no longer deposited. The results are given in the table below:

Temperature (°C)	20	40	60	80
Pressure (bars)	2	4	6	11

Stupnik

A number of measurements were made at the well Stupnik-1 near Zagreb, but only a small portion of them will be presented. On the basis of the interpretation of the RLT it was established that the first boundary of the source is located at about 8,300 meters from the borehole. Since a substantial lithological barrier is located on the northwest of the well in the Zagreb area at the same distance, that is probably the border on that side. Since the other borders have not been established, it can be concluded that the source extends more than 8,300 meters in the other directions. Although all of 98 meters of stratum were discovered, measurement of the production profile showed that the full production was obtained from only 2 meters. The probable reasons for this are blockages of some of the pores when the borehole was drilled as well as possible primary or secondary fracture. It is quite likely that the effective depth of the stratum is considerably greater in the more distant parts of the aquifer. This is indicated by the form of the pressure gradient curve as well as by the deterioration of the productivity index as the quantity increases.

We have given here only a small portion of the tests conducted at these localities. We are persuaded, however, that this is sufficient to illustrate how valuable are the data on the water-bearing stratum, stratum fluids and their mutual relations that can be obtained only with a few instruments, a minimum number of necessary operators and without financial backing.

Conclusion

It is evident from the discussion above that we did not always obtain answers to all the questions put in these tests. However, this does not diminish the importance of and need for such tests, since the fact that with the RLT, for example, we do not ascertain the boundaries, form or type of source, does not mean that the measurements were unsuccessful, but rather that we are not dealing with a lens, but with an aquifer of sizable extent.

The fact that the occurrence of very corrosive sulfur gas was established only at Stupnik means far more than if the problem had not been detected at all.

Results of this kind justify conducting explorations and instill optimism as to the ultimate benefits. It is expected that exploratory work in this and indeed in future phases of studying the geothermal potential will not involve any major technical problems, since even now most of the basic parameters are well known, such as temperature, degree of mineralization of thermal water, pressures in the aquifer, porosity and permeability. However, the risk with respect to the flow of the individual geothermal wells, even though they are drilled in aquifers of known qualities, is always there, and for that reason every geothermal well belongs in the category of an exploratory well. At the same time, according to our knowledge of thermal aquifers to date, they are predominantly aquifers of the closed or finite form. That is why the spent thermal water has to be returned to the stratum in order to preserve the aquifer's energy and to guarantee long-term use. Moreover, regulations on environmental protection do not allow relatively large amounts of mineral water to be discharged into open streams.

The motivation of the economy which might use this type of energy is considerably limited because of the factors of risk, the sizable initial investments, and also because of the peculiarity of the conduct of processes in surface installations. They must always be specifically designed for each individual case and constructed on a custom basis if the system is to be optimally utilized from the thermal and economic standpoints and especially so as to prevent corrosion of equipment and the formation of scale. It is inevitable that many specific problems will arise in this area which will have to be solved by teams of inventive and highly competent mechanical and power engineers. This factor can considerably affect the rate of introduction of the use of geothermal energy in the economy.

That is why the pooling of labor and capital with professional organizations outside INA-Naftaplin and potential users should first be undertaken. One might suspect that in the further course of investigation and use of geothermal resources in the Pannonian Basin a number of legislative problems will arise in connection with ensuring optimum and professionally competent use of these sources, with preventing their pollution and possible devastation so as not to destroy the natural equilibrium of the aquifer, and related to protection of known and potential oil and gas fields, as well as those not yet discovered.

7045
CSO: 2800/352

YUGOSLAVIA

GEOTHERMAL ENERGY POTENTIAL IN SERBIA

Zagreb NAFTA in Serbo-Croatian No 5, May 81 (manuscript received 15 Dec 80) pp 237-241

[Article* by Ljubisa Paradjanin, professor, and Nenad Djajic, docent, both doctors of engineering sciences at the School of Mining and Geology at Belgrade University: "Possible Potential of Geothermal Energy in SR [Socialist Republic] Serbia"]

[Text] Introduction

Although geothermal springs are well known in SR Serbia and famous for the place where they occur, above all as part of the use of geothermal energy for therapeutic and balneological purposes, until recently there were hardly any significant writings in the professional literature about them as important manifestations. The first scientific approach to these phenomena, one which emphasized their importance as a source of energy, dates from 1965 [1]; it treated the technical and economic possibilities of using geothermal energy in just one small portion of the Pannonian Basin--in the Banat Depression. The abundant documentation made available as part of oil and gas explorations over a quite broad territory in SAP [Socialist Autonomous Province] Vojvodina has also made it possible to investigate deposits of geothermal anomalies. Continuation of further research is based on the same foundations, especially in SAP Vojvodina. Greater attention has been paid to explorations since 1973.

The 1975 conference on geothermal energy made a relatively quite large contribution toward arousing broader interest and more intensive investigations of the geothermal energy potential and its possible use in SR Serbia. Among other things, it was stated at the conference that all the natural preconditions exist in our country for discovery of geothermal energy at both the fairly high and fairly low temperature levels, that the level of exploration is very low from the standpoint of compiling a geothermal energy balance and that total effort up to the year 2000 should therefore be directed toward geothermal energy taking up its proper share in meeting the needs for energy [2].

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* Delivered as a paper on 24 April 1980 at the 11th Regular Plenum of the Scientific Council for Petroleum of JAZU [Yugoslav Academy of Sciences and Arts].

At the same time the communities for science of SR Serbia and SAP Vojvodina have approved work on two scientific research projects. A study in the form of a program for investigation and use of geothermal energy in SAP Vojvodina has been completed and is being used as the foundation for other activities, while the second is now under way and has to do with the region of Serbia proper [3, 4].

Investigations of the Phenomena Causing Geothermal Anomalies

Investigations into the phenomena causing geothermal anomalies were at one time inseparable from geological and geophysical explorations for oil and gas. It is a favorable circumstance that all those geological explorations pertaining to stratigraphy, petrography and tectonics, all the geophysical prospecting with gravimetry, magnetrometry, seismic and other logging methods, all the investigations of the petrophysical parameters of reservoir rocks, distribution provinces and fluid physics have a direct bearing on exploration for both petroleum and geothermal energy. With respect to the Pannonian Basin, the data of hydrodynamic tests and deep measurements in deep exploratory and production wells have had particular importance in investigating the causal phenomena [1, 4].

Though there are differing assumptions concerning the occurrence of geothermal anomalies, the conclusions drawn on the basis of our own research, which also has general importance, can be summarized as follows:

a) that it can be assumed that large-sized thermodynamic movements and related convection currents exist in the transitional zone;

b) that the intensity of convection, in conformity with the assumed temperature of the transitional zone, is unable to cause pronounced geothermal anomalies;

c) that there is direct influence of radioactivity, but its influence on the geothermal anomalies noted is unknown;

d) that in the process of formation and subsequent evolution of the earth disintegration of radioactive elements has had an influence in creation of heat; and

e) that geothermal anomalies can be interpreted only in terms of a set of influence--convection of the heat of the interior, disintegration of radioactive elements, intrusion of magma, and conduction of heat either directly or through deep displacements [1].

Investigations subsequently conducted into the causal phenomena of geothermal anomalies in SR Serbia proper, though basically different from the investigations conducted in the sediments of the Pannonian Basin, have furnished confirmation of the conclusions above [4]. An analysis of all the relevant data of the abundant scientific fund of geological documentation was taken as the point of departure in establishing possible geothermal anomalies and their causes in this area. That is, it is well known that the Moho discontinuity in

SR Serbia lies at a depth between 30 and 40 km, which is 10 to 20 km deeper than the Pannonian Basin. This points up at the same time the fact that the geothermal anomalies in this area cannot be related to convection of heat from the upper mantle. That is why the investigations were oriented toward other factors as the causes, above all toward intrusions of magma (acidic particularly), radioactivity and macrotectonics.

By contrast with basic intrusions, the acidic magmatic masses (granitic) with a diameter of about 10 km, intruded with a temperature between 600° and 800° C, have maintained temperatures of over 500° C for more than 2 million years at the contact with the surrounding rock masses. After consolidation of that mass, the surrounding rock masses 2 km away from the contact will maintain a temperature higher than 400° C, again for more than 2 million years. This time is even longer than 4 million years for intrusions of greater size, since the cooling time increases directly with the square of the diameter of the intrusion [4]. When intrusions are quite large, one can expect relatively high temperatures (over 100° C) even several kilometers from the contact for several million years.

Along with the influence of intrusions of magma, they are at the same time producing heat by virtue of radioactive disintegration of elements. Acidic magmas also produce a larger amount of heat than basic magmas (granites 2,970, granodiorites 1,505, basic magmatic rocks 544 and peridotites only between 6.7 and 28.4 W per cubic kilometer. Limestones and sandstones are similar to basic rocks in their production, and marls are much like granodiorites [4]. A map of radioactivity has been supplied only for a portion of the Banat Depression, but sufficient data of measurements are not available for the territory of SR Serbia proper.

Aside from investigating the causes of geothermal anomalies, in certain localities isotopic investigations were also made by the methods of chemical and isotope geothermometry, analyses for concentration of tritium, and relative deviation of deuterium and O^{18} from the established standards. In addition to determining the relative age of a free spring, the relative relations of the hydrological cycle and sources of heat also had to be determined. Aside from the answers given to certain questions, the results obtained also indicated the possible contribution of these methods in investigations of geothermal energy [4].

Assessments of the Possible Potential

As we have already emphasized, as oil and gas explorations were made in the Pannonian Basin, the necessary knowledge was also gained on the possible geothermal potential. It has been proven that enormous amounts of water are accumulated in the porous space of rock masses, some of it slightly mineralized (1-2 grams per liter) and some highly mineralized (over 40 grams per liter). On the basis of numerous measurements in wells, maps have been furnished of the geothermal isograds along the floor of the Neogene and the roof of the basement (temeljno gorje) [1], as well as a map of the pre-Miocene complex [3]. Charts have also been furnished of geothermic isolevels as well as a map of isotherms [1] along the floor of the Neogene and the ceiling of the basement.

It can be said on the basis of all these data that investigations of geothermal energy in the southeastern portion of the Pannonian Basin have been brought to the phase where further investigations can be directed precisely at determining the thermotechnical and economic parameters for purposes of compiling a balance of this potential and of defining the necessary parameters for use in the particular sectors of consumption. Particular emphasis is put here on the problems of highly mineralized hot water (systems III and IV), while at the same time preference is given to the first and second systems of fresh water, though they have lower thermal characteristics.

The region of Serbia proper is far from the level of exploration of the Pannonian Basin in SAP Vojvodina. Within the scientific research project mentioned, aside from investigating the causes of geothermal anomalies which has been mentioned, particular attention was paid to regionalizing the terrain of interest to further explorations with a view to defining the potential and the possibility of its use. The entire territory was ranked in four groups according to potential on the basis of the explorations conducted to date [4] (Figure 1):

a) Relatively small areas in southeast and to some extent central Serbia (the region around Vranjska Banja, Sijerinska Banja and Josanicka Banja) belong to the first group, which has a high probability of occurrence of hot water to moist steam at relatively shallow depths.

b) Broader areas of Vranjska Kotlina, southwest rim portions of the Lece massif and the northwestern extension of Sijerinska Banja, and then the region of Rogozna and the Ibar Valley, the southern rim of the Krusevac-Kraljevo Depression, the northeast rim of the depression along with the area of Kotlenik and Rudnik, Miocene basins to the north of Bukuljski Horst and the zone along the eastern rim of Avala and Kosmaj, and from there south to Mladenovac belong to the second group of terrains where the occurrence of thermal water with high temperature can be expected.

c) Broad areas partly between zones which belong to the previous groups and partly along large faults fall in the third group of terrains in which there is considerable probability of the occurrence of heated water. By virtue of that fact this group encompasses the major portion of the territory of Serbia proper.

d) The fourth group of terrains where occurrence of only hot thermal waters with temperatures under 50° C and to a depth of 4 km can be expected includes the Sava Valley, the Danube Valley, localities in the valley of the Velika Morava and Juzna Morava, as well as in the valley along the streams of the Zapadna Morava.

In Serbia proper only five wells have been drilled so far to a depth of 1,000 meters; they were sunk only in order to obtain mineral water and there is one well drilled to 2,022 meters with the combined task of being the first well for purposes of structural exploration both to meet the needs of general and petroleum geology and also to meet the needs of geothermal energy. By virtue of that fact the necessary data are not available for making it possible to prepare a map of isotherms or geothermal gradients.

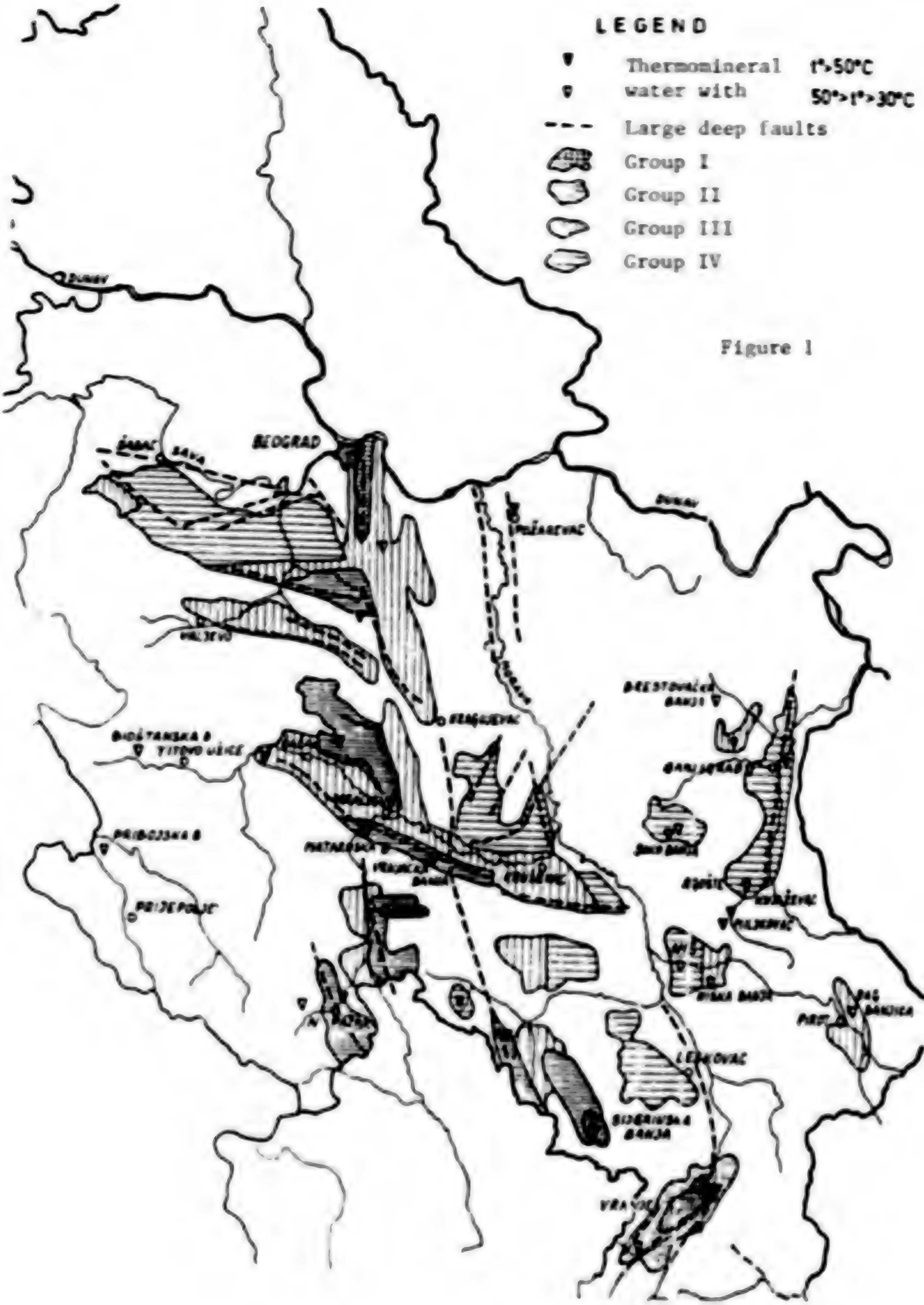
LEGEND
Thermomineral water with t°>50°C
Thermomineral water with 50°>t°>30°C
Large deep faults
Group I
Group II
Group III
Group IV
DUNAV
ŠABAC
SAVA
BEOGRAD
DUNAV
POŽAREVAC
VALJEVO
KRAGUJEVAC
BRESTOVAČKA BANJA
BIOŠTANSKA B
TITOVO UŽICE
PRIBOJSKA B
PRIJEPOLJE
MATARUŠKA B
VRNJAČKA BANJA
KRUŠEVAC
SOKO BANJA
KNJAŽEVAC
NIŠKA BANJA
PIROT
BANJICA
LESKOVAC
SIJERINSKA BANJA
VRANJE

Figure 1

Extensive geophysical explorations have been conducted in Serbia proper, but only in 1978 did the data of those tests begin to be used for the purposes of geothermal energy and to plan the necessary geophysical measurements.

With respect to the geotectonic complex of the area, Serbia proper is more complicated than the area of SAP Vojvodina, so that before deep drilling is undertaken, all methods of exploration which can contribute within the limits of time and money should be used, regardless of whether regioral or detailed explorations are involved, so that favorable results are obtained from the minimum number of wells.

On the basis of the data of 2,878 km of seismic profiles it became possible to compile maps of isopachs of sedimentary basins and the depths of the basement, as well as a regional geotectonic map [5].

The figures on 102 slightly thermal and thermal mineral springs examined in conjunction with the results of geophysical tests indicate that almost all are located in dislocations, i.e., in zones of a pronounced gradient of anomalies with dislocation zones of varying extent. Pribojska and Obrenovacka Banja, which lie in zones of the gravimetric minimum, constitute an exception.

The results of seismic tests and also the results of geothermal tests along the profile Krusevac--Sabac, along which tests were run of the structure of the crust by deep seismic sounding are of particular interest to an overall examination of the conclusions which have been framed and of the results. The data indicate that the Neogene complex must be viewed separately and also point to the fact that use of this geophysical method can also furnish a definite contribution to defining above all the position and extent of the basic mass as well as of the dislocation faults.

From the exploratory oil wells drilled to date results have been obtained on temperature gradients which make it evident that they increase from south to north toward the central portion of the Pannonian Basin (from 4.683° C per 100 meters in the Cacak Basin to 5.684° C per 100 meters at Palanacki Kiseljak). In the Neogene in eastern Serbia the temperature gradients are about 40 percent lower than those given above (about 3.5° C per 100 meters), except for the geothermal anomalies of the dislocated zone.

Investigations Toward Utilization of Geothermal Energy

Within the scientific research concerned with the use of geothermal energy particular attention has been paid to defining optimum heat diagrams, the most important element in the entire work of designing future installations for use of geothermal energy. It is well known that geothermal fluids have a number of specific features which have to be respected in defining the heat diagrams. The experience to date in the use of geothermal energy indicates that it is unwise to use geothermal energy solely for one energy purpose, but that it has to be used on a multiple basis and even tied to the possibility of industrial processing.

On the basis of current knowledge geothermal energy in SR Serbia proper will have its primary use in agriculture, in centralized supply of thermal energy for heating and for recreation and balneological purposes. That is why intensive work is being done on use of geothermal energy in our country within the Energy Center of the School of Mining and Geology, furthered by financial aid from public and work organizations and also by the Serbian Republic Community for Science; particular attention is being paid in this work to the use of low-temperature thermal waters [6].

However, unfortunately it must be noted once again on this occasion that use of geothermal energy in Serbia has for all practical purposes not even begun, with the exceptions of certain spas where this water is used for local purposes. The principal reason for this should be sought in the fact that there are still no major installations that have been built in our country that might be used as the basis for ascertaining the technical-and-economic parameters of the use of geothermal energy.

Yet we must note that today the situation is changing in this regard, since we detect an ever greater interest in the use of geothermal energy. Especially important in this regard is the initiative of the Consolidated Serbian Power Industry to have a study prepared so that an examination can be made of the possibility of using geothermal energy as a substitute for a portion of the electric power which is today being consumed to meet the needs of low-temperature processes in both residential and public consumption. The design assignment has been defined as exploring the possibilities for larger use of geothermal energy for heating and preparation of water for consumption, especially tied in with heat pumps.

There is also a clearly pronounced interest on the part of certain sociopolitical communities (Kikinda, Zrenjanin, Subotica, Gornji Milanovac, etc.) in the use of geothermal energy in centralized systems for supply of thermal energy. It is well known that thermal fluids, as carriers of thermal energy, can very conveniently be added to existing systems for supply of thermal energy, thereby reducing consumption of conventional fuels.

There is an interesting project in the spa Melenci for multiple use of geothermal energy for heating, preparation of hot water for consumption, and for balneological purposes. The Fuel and Power Center of the School of Mining and Geology has assumed the obligation to work out a general conception for use of geothermal energy in combination with a gas-fired final-stage heater.

Concluding Considerations

It can nevertheless be said by way of conclusion that in spite of the low level of exploration a broader and more lively public interest is being shown in gaining knowledge more quickly about the real potential of geothermal energy. One such effort is the resolution of the Interacademy Committee for Fuel and Power to the effect that the overall problems of geothermal energy of interest to the entire country should be worked on and examined by 1985, an effort in which the activity of the Scientific Council for Petroleum of JAZU can offer a large contribution.

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GEOTHERMAL ENERGY PLANS IN VOJVODINA

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[Article* by Zoran Milovanovic, mining engineer and member of the business board for R&D relations; Slavko Alimpic, engineering geologist and head of the Department for Hydrogeology; and Dragan Nikolic, engineering geologist and assistant director of the Research Sector; all of Naftagas, Novi Sad]

[Text] Introduction

The quite rapid growth of consumption of petroleum derivatives as compared to the possible growth of domestic production of petroleum and natural gas, as well as the greater difficulty of importing the amounts that represent the difference and the limiting factors in the production and consumption of coal have recently been turning attention to exploration, application and use of alternative forms of energy. Geothermal energy is one member of this group of possible energy sources.

The goals of investigating geothermal energy are above all the future and long-term substitution of a portion of conventional energy in a technical-and-economically acceptable way through the application and use of thermal energy accumulated in rock masses and fluids filling the pores of the earth's crust as a consequence of emission of heat from the interior of the earth or of local processes within the crust itself. Subsurface water or natural steam are the best medium for carrying the heat rapidly to the surface of the earth.

In SAP [Socialist Autonomous Province] Vojvodina the investigation, application and use of geothermal energy is being shown more interest than any of the other alternative sources. Nor are other forms of energy being neglected. For example, attention is being paid to investigation of the application and use of solar energy, bioenergy, wind energy, etc. This approach is quite understandable when one is aware that Vojvodina does not have a sizable hydropower potential, nor large coal reserves, nor petroleum-geological conditions which afford a very rapid growth of production over a lengthy period of time so as to meet the demand for energy in this region in the future. Nevertheless, the potential for petroleum and gas production is such that for a long time it will have a significant impact on the province's overall social and economic development and especially on development of the petroleum, chemical and petrochemical industries.

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History and Results of Investigations of Geothermal Energy in Vojvodina

In view of the markedly favorable geothermal gradient over a major portion of the Pannonian Basin, thermal and thermomineral waters, sometimes exceeding 100° C, occur even at depths between 1,500 and 2,200 meters. It is thought that the water reserves are mostly renewable, and they also are quite widespread geographically. That is why it is judged that subsurface water in Vojvodina has a relatively large energy potential.

Beginning in 1970 systematic and extensive hydrothermal explorations and studies of the manner of use and application were undertaken by the work organization Naftagas. This organization has carried on all the efforts to date, and it is in fact registered to perform this activity.

Studies of subsurface water in Vojvodina began long ago, but the work organization Naftagas resumed them 30 years ago with the first exploratory oil and gas wells. Those water strata directly related to oil and gas pools were particularly studied. By 1979 1,162 exploratory and production wells had been drilled for petroleum, gas and subsurface water, representing 1,719,500 meters of total drilling. A huge fund of geological, hydrogeological, geochemical and geothermal data have been gathered and have been of exceptional help in preparing studies and programs for exploration of subsurface water.

The scientific research study entitled "Thermal and Thermomineral Waters of Vojvodina and Their Use Potential" was written in 1975 on the basis of data in the literature and the data of this rich documentation and previous technical papers. The study showed among other things the state of knowledge of this water in Vojvodina, it dealt with the natural conditions for occurrence of water and the basic features and patterns of geographic extent, and it pointed to the technical and economic problems that would have to be solved in order to undertake more extensive use of this water.

The "Program for Investigation of Geothermal Energy and Thermomineral Water in SAP Vojvodina Over the Period 1976-1985" was prepared on the basis of that study. Under that program 28 exploratory wells were to be drilled, representing a total drilling of 32,400 meters, and about 50 wells negative for oil and gas were to be tested for water. Up through 1980 progress in fulfillment of the program stood at 22 hydrothermal exploratory wells representing a total of 19,000 meters drilled, and 16 wells negative for oil and gas had been tested for water. Investment in these operations will be considerably larger than the investment envisaged by the program up to 1980.

Hydrothermal studies in the period 1976-1979 confirmed the premises contained in the study and indicated the following:

i. that Vojvodina does not have natural superheated steam (175° C or higher) for production of electric power;

ii. that the data obtained in explorations to date are not sufficient for compiling a balance of potential reserves of geothermal energy in Vojvodina;

iii. that there exist four principal hydrogeological complexes, as follows:

a) Hydrogeological System I has the greatest importance, since it contains aquifers with large reserves of water with low mineralization.

It consists of alternating strata of clays, sands, and sand-clay sediments of the Upper Pontian and of paludal strata with the Quaternary period. It covers almost the entire territory of Vojvodina and attains its greatest depth in northern and central Banat. Over most of the area the outlet temperatures of the water range between 25° and 60° C, and it [?] is limited to the depression itself. The discharge per well ranges even over 1,000 cubic decimeters per minute.

b) Hydrogeological System II has an important role as a hydrogeological insulator between System I and the older Systems III and IV. System II consists primarily of marl, clay, marlstone, aleurolite, and sandstones of the Lower Pontian and Pannonian. In northern and central Banat it includes series of sands and sandstones in the form of lithological lenses. Because of the low flow capacity, the absence of good reservoir rock over a broad area, hydrostatic pressures, inadequate reserves and high mineralization running to 15 grams per cubic decimeter, the system has no major hydrothermal importance. Estimates of the discharge generally range from 50 to 200 cubic decimeters per minute or 300 cubic decimeters per minute per well. In exceptional cases the yield is somewhat higher in the northeastern portion, and the outlet temperatures may even be as high as 80° C.

c) Hydrogeological System III has in its makeup, aside from marl, marlstone and clays, clayey-marly sediments, sediments with good reservoir characteristics in the form of Miocene sandstones, conglomerates, breccias and limestones. The water is highly mineralized (even exceeding 40 grams per cubic decimeter). Unless there is a solution for dumping the water used or returning it underground, its direct use is not contemplated at present, though it reaches the surface through wells from depths of over 2,000 meters and has a temperature exceeding 90° C.

d) Hydrogeological System IV is represented mainly by rocks from the pre-Neogene substratum: metamorphic, magmatic and sedimentary rocks of secondary porosity, such as the eruptive mass, crystalline schists, limestones and dolomites. The system has not been sufficiently studied. Because of hydraulic connection with System III, it contains highly mineralized water. Especially interesting are the Triassic limestones and dolomites to which particular attention should be given.

The study goes on to point out that a number of technical-and-economic problems have to be solved if the water from these hydrological systems as a whole is to be used, problems such as optimum well design and the method of equipping the wells for operation, the method of degasification of the water, a method of solving the problem of formation of scale and prevention of corrosion. Solving the problem of dumping large amounts of waste mineralized water after use, which would otherwise have an impact on the ecological situation and would pollute the environment. Application of heat exchangers and heat pumps. Solving the problem of collecting and transporting the water. Specific examination of the economic aspects so that the use of thermal water would be justified from the commercial standpoint so that potential users would adopt this alternative form of energy in spite of all the burden its use involves as compared to conventional fuels.

Investigations of thermal water in the period 1970-1979 have represented the initial phase in systematic studies. Valuable experience has been gained, and possible directions of development have been examined.

The Program for Investigation, Application and Use of Geothermal Energy Over the Period 1981-1990

From the standpoint of the extensiveness of the necessary investigations, the technical-and-economic problems and the multiple relevance of the solutions to broad application of geothermal energy, the work organization Naftagas has offered an altogether new initial concept and a new program for investigation, use and application of geothermal energy in SAP Vojvodina over the development period 1981-1990.

The new program has also called for changes to be made in the approach to investigations of water, beginning with the plan for 1980.

The most extensive explorations will be oriented under this program in the domain of Hydrogeological System I and will also be governed by the regionalization of Vojvodina with respect to likelihood of occurrence.

Hydrogeological System I is being paid the greatest importance because it includes the principal aquifers with large reserves of fresh or slightly mineralized water with extensive horizontal and to a slightly lesser extent vertical interconnections. The outlet temperatures are at times close to 100° C, and the well yield exceeds even 1,000 cubic decimeters per minute. This system is also the largest reservoir of drinking water and industrial water, and even today thought is being given to bottling it for general consumption. The water of this complex has the least impact on occurrence of corrosion and does not require expensive disposal of wastewater. It is expected to be possible to use it in part without heat exchangers. The use of heat pumps will make it possible to increase the utilization of geothermal energy which this water carries and to apply it in diverse ways. Because of all we have said it is expected that the study of the economic aspects of exploitation of Hydrogeological System I will result in commercial application and use at the earliest date. The water of this system can be used most widely and quickly for a range of purposes from heating dwellings and public buildings to hothouses, the drying of farm products, for recreation purposes and the spent water can even be used for water supply and irrigation. It will also have the least impact on the ecological situation and environmental pollution.

This water contains dissolved gas and often has a gas factor running as high as 1 cubic meter per cubic meter of water, the methane content running to 95 percent, aside from the content of carbon dioxide and nitrogen. This represents an additional energy potential which should be seriously taken into account in the future.

Serious reliance is also being put on the possibility of combined use of the thermal water of Hydrogeological System I and methane from small gas deposits that exist in the higher portions of the Pliocene in Banat and Backa. The geological reserves go as high as 30 million cubic meters for the various occurrences, the purity of the methane runs as high as 95 percent, but is not connected to the gas supply system, that is, to main gas lines, because of the small reserves and low pressures.

Investigations of Hydrogeological Systems II, III and IV will continue primarily with the testing of deep wells negative for petroleum and gas, and persistent work will be done to solve the technical-and-economic problems which have been enumerated and possibly also the separation of trace elements from the water, so that the geothermal energy of these systems would also be used in the future, as would the minerals they contain. The water of these systems also contains dissolved gas with a gas factor between 1 and 3 cubic meters per cubic meter of water. The gas is mainly methane.

The new program for development in the period 1981-1990 envisages further intensive explorations and accelerated development of several geothermal fields with several production wells and mass production of thermal water and energy. So that the technical-and-economic problems can be solved at the same time, experimental stations will be set up for hydrodynamic tests over a lengthy period of time when the first well is found to be positive.

The stations will conduct tests of the influence of corrosion and possible formation of scale, the use of heat exchangers and heat pumps and all other elements that have a bearing on the drafting of the feasibility study and designs for field development and production.

The long-range development program over the period 1981-1990 calls for drilling 90 exploratory and production water wells representing a total of 131,000 meters of drilling. Over that same period, and in addition to those wells, 52 wells negative for oil and gas will also be tested. Within the 1981-1985 period, 36 wells will be drilled, representing a total drilling of 52,000 meters, and 24 wells negative for oil and gas will be tested, while in the period 1986-1990 54 wells will be drilled, representing 79,000 meters of drilling, and 28 wells negative for oil and gas will be tested for water.

The projects include chemical, balneological and bacteriological analyses, hydrodynamic measurements, analyses for corrosion and formation of scale, the necessary studies, other analyses, project plans and project feasibility studies, all the way to offers to consumers.

In 1983 it is expected that the first balance of thermal water of local geothermal fields will be compiled, and later one will be compiled of the total

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